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WILDLIFE IN NORTH CAROLINA

WILDLIFE IN NORTH CAROLINA
2009 PHOTO COMPETITION

This barred owl that had been hit by a car was being rehabilitated at Neuseway Nature Park in Kinston. The bird later had a leg amputated and is now a permanent resident of the park. **PHOTOGRAPH BY TIMOTHY FAULKNER.**

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WILDLIFE IN NORTH CAROLINA

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Cover: The story behind the Grand Prize photo of a tiny songbird chick is one of human-induced landscape changes, a talented young photographer and making the most of an opportunity. **PHOTOGRAPH BY KAYLYN J. GRUBER.**

Wildlife in North Carolina is the official educational publication of the North Carolina Wildlife Resources Commission. It is dedicated to the sound conservation of North Carolina's wildlife and other interrelated natural resources and also to the environment we share with them.

EDITOR'S NOTE

We try to pay a lot of attention to detail in each issue of the magazine. Whether it's searching for exactly the right photo or spending the time to create a great headline for a story, the little things make a big difference in the final product.

NANCY SAMANTHA HALSTEAD

Our judges apply the same standards when selecting the winners of our annual photo competition. Texture, mood, emotional impact, storytelling, uniqueness—these detail-oriented factors join composition, lighting and technical excellence in determining which photographs have that extra special something that makes them stand out from thousands of other entries.

Reading and following the competition's rules is also part of attention to detail. We disqualified a stunning eight images from finalist consideration this year, far and away the most ever. A few had been published in other print media, and some had content added or removed using photo editing software. A couple were high dynamic range (known as HDR) images, where a photographer takes several different exposures of the same subject and uses a piece of software that combines them to create a perfectly exposed photo. It's great for photos that include areas of bright sun and dark shadow, such as sunrises and sunsets. But it's a composite image made of multiple exposures, and though it's a neat technical trick that produces beautiful images, it is against the rules.

While winning the photo competition gets more difficult each year, taking great nature photos is so easy a child can do it. In fact, lots of children already do take great nature photos. Nancy Halstead's photo (above) of a toad in a bucket was taken in her Walkertown yard. All she needed was a camera, a good eye and a solid sense for how to compose a neat image with visual impact. Eleven-year-old Nancy also placed third in the Youth Photographer 12 & Under category with a well-composed photo of a treefrog (page 31).

If you entered the photo competition and did not win, please check out our Web site, www.ncwildlife.org, starting on May 1 to review the rule updates and get photo tips. The competition will open on June 1. Start taking photos now!

If you simply like seeing the fantastic work of dozens of nature photographers, sit back and enjoy. We have a great issue for you.

Greg Jenkins

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WILDLIFE IN NORTH CAROLINA

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Sinfully Enjoyable

I was deeply moved by Jim Wilson's article "A Sin of Omission" (Nov. 2009). It is one of the clearest, best written and most honest stories I've read in a long time. It resonated with me on many levels, but not the obvious ones. I'm not a hunter, grew up without a father present, loved dogs and other pets but never as working ones. Yet the connections between man/boy and nature, between elders and the young, between loyal pets and their "masters," and most tellingly between our inner secrets and our outer personas — all those weaved together to evoke memories in me and in some ways to allow me to forgive some of my own "ghosts of regret." Thank you. Creatures like Jo are sent to us as angels, forgiving us without justifiable reason or merit. Just grace.

Chris Canfield
Executive Director/Vice President
Audubon North Carolina
Chapel Hill

I always enjoy Jim Wilson's writing a great deal, but this one may be his best. It certainly evoked memories of childhood, my dad, and why the outdoors is such a part of so many of us who grew up here. As our state becomes more urbanized, fewer of us will have these memories to draw on — even "confessions," which are good for the soul.

Bill Webb
Ellerbe

I savored every word of your heart-wrenching memoir "A Sin of Omission." I am the daughter of a once-avid grouse hunter. As a young child — a "daddy's girl" — nothing could compare to a Saturday in the woods with Dad and Lady, his Brittany spaniel.

An unfortunate accident took the life of Lady and one of her pups on a still winter's night. My brother and I buried them. Daddy was so heart-broken, he couldn't do it. We never talked about that day. We've suffered our grief in silence. My dad gave up the hunt years before he passed away in 1993.

Your story was powerful for me. It brought back raw memories that desperately need healing. Your last line haunts me: "I'd like to apologize now, but there's no one left who would give a damn." Rest assured, you have a reader living in the foothills of the Blue Ridge who gives a damn!

Sheree Sloop
Wilkesboro

You don't have to be a hunter to love Jim Wilson's story. You just have to be human!

Blue Breese
Topsail Beach

I was particularly moved by Jim Wilson's article. Coming from a hunting family, my Jo was called Cindy. At an old age she just wandered off one day never to be found. I stopped hunting after reading a story in your magazine or perhaps *Sports Afield* about geese mating for life and the female coming around only to be killed herself over her mate. My guns are packed away along with my father's now waiting to be passed on to my son who presently has no time to hunt.

Your last section, "Fault and Blame," was especially moving. My father experienced a similar fate during which I couldn't show my true feelings toward him. Both my father and my mother came from non-demonstrative families, which of course is how I was raised. I am trying to change the pattern with my granddaughter. Hopefully it will work. Your last paragraph was right on the mark. I certainly share your thoughts of not measuring up to "self-imposed standards." Thanks for writing a story so moving.

Capt. Steve Hamilton
U.S. Navy (Ret.)
Address withheld

Absolutely spectacular piece of writing by Jim Wilson. It is readily apparent he knows (a) birds, (b) bird dogs, (c) guns, (d) families and (e) how to strike a keyboard. I'm glad to know I'm not the only hunter who ever deeply sniffed a fallen bird — grouse, on my side of the mountains — and pondered, "What the hell is it that (insert favorite dog name here; Kip or Belle in my case) finds so intoxicating?"

Sam Venable
Columnist/former outdoors editor
Knoxville News Sentinel
Knoxville, Tenn.

Loosen Up

In his excellent "Venison Tips" article, (Nov. 2009) T. Edward Nickens forgot the most important tip of all; NEVER butcher a deer until rigor mortis has left the body. It takes about 12 hours and if you cut into a rigid deer before that, even just to quarter it, you've guaranteed yourself tough meat. Definitely leave the skin on; this keeps dirt, bugs and bacteria from coming into contact with the meat, helps retain moisture, and regulates the cooling process.

Also, I suggest that Nickens and others investigate the "wet aging" process, which involves aging the meat in primal cuts in vacuum sealed bags at 35 to 40 degrees (FoodSaver works great). That's the way most beef is aged these days, and it makes for much juicier venison, which has a tendency to be dry. Eight to twelve days is the amount of time to get tasty, fork-tender venison.

Fred Atkins
Cary

write us

Letters should be sent via e-mail to **letters@ncwildlife.org** *or through regular mail to Letters,* Wildlife in North Carolina *magazine, 1712 Mail Service Center, Raleigh, NC 27699-1712. Please include your name, address and daytime phone number. Letters chosen for publication may be edited for clarity and length.*

WILDLIFE IN NORTH CAROLINA 2009 PHOTO COMPETITION

CALL IT THE YEAR OF THE YOUNGSTER. For the first time in its five-year history, our photo competition was won by a teenager. Kaylyn J. Gruber, a 16-year-old photographer from Belmont, submitted her grand prize-winning black-and-white photo of a brown-headed cowbird chick in the Youth 13–17 category. In Wild Plants, 15-year-old Noah Boyd of Willow Spring was awarded honorable mention for his photo of dew on grass, while Youth 12 & Under saw its youngest honorable mention winner ever, 4-year-old Olivia Jordan Leigh of Pasadena, Md., who entered a picture of Hickory Nut Falls.

Gruber captured her winning image at her Gastonia high school, Highland School of Technology, in May 2009. Between classes, a friend spotted the tiny fledgling on a sidewalk and warned Gruber not to step on it. When the chick appeared unable or unwilling to move, Gruber ran to get a camera and took photographs before shooing the bird into the bushes and out of harm's way.

Gruber was not sure what species the chick was, so we sent her photo to John Gerwin, curator of birds at the N.C. Museum of Natural Sciences. Gerwin identified the fledgling as a cowbird that was no more than one or two days out of the nest. He said that chicks of this size can fly despite their lack of a tail, unless they are injured. Their tail feathers develop fully over the course of about three weeks.

Gerwin also explained that the "problem" of brown-headed cowbirds, a brood parasite that lays its eggs in other birds' nests for them to raise, was created by humans. When we extirpated their precolonial host, the bison, and altered natural landscapes to include a multitude of agricultural lots and lawns, cowbirds expanded from the Great Plains to occupy the newly created grasslands at forest edges. So whether you love or hate the brown-headed cowbird, Gruber's photo is a great image of a species that survives exceptionally well.

The photo competition is intended to encourage high-quality nature photography and to identify talented wildlife photographers working in North Carolina. This year's field totaled 8,802 photographs—our largest number of entries ever. In the competition's fourth year, 1,889 photographers took part, including 216 junior shutterbugs in the two youth categories.

The most popular subject was Birds (1,532 entries), followed closely by the landscape category, Peaks, Valleys & Plains (1,472) and Invertebrates (1,305). Wild Plants received 1,172 entries and Reptiles & Amphibians 868, Animal Behavior 769, Outdoor Recreation 692, Mammals 572, Youth 13–17 227 and Youth 12 & Under 193.

We thank our corporate sponsor, Great Outdoor Provision Co., for its generous participation in this year's competition. Valuable support was provided by our co-sponsors, the N.C. Museum of Natural Sciences, the N.C. Division of Parks and Recreation, and our new partner, UNC-TV and its broadcast of "Nature," the iconic natural history public television program.

Our judges included *Wildlife in North Carolina* art director Vickie Cumbee; *WINC* graphic designers Marsha Tillett and Kristie Rhodes; Mike Dunn, coordinator of teacher education for the museum; and Charlie Peek, public information officer for Parks and Recreation and a former photojournalist.

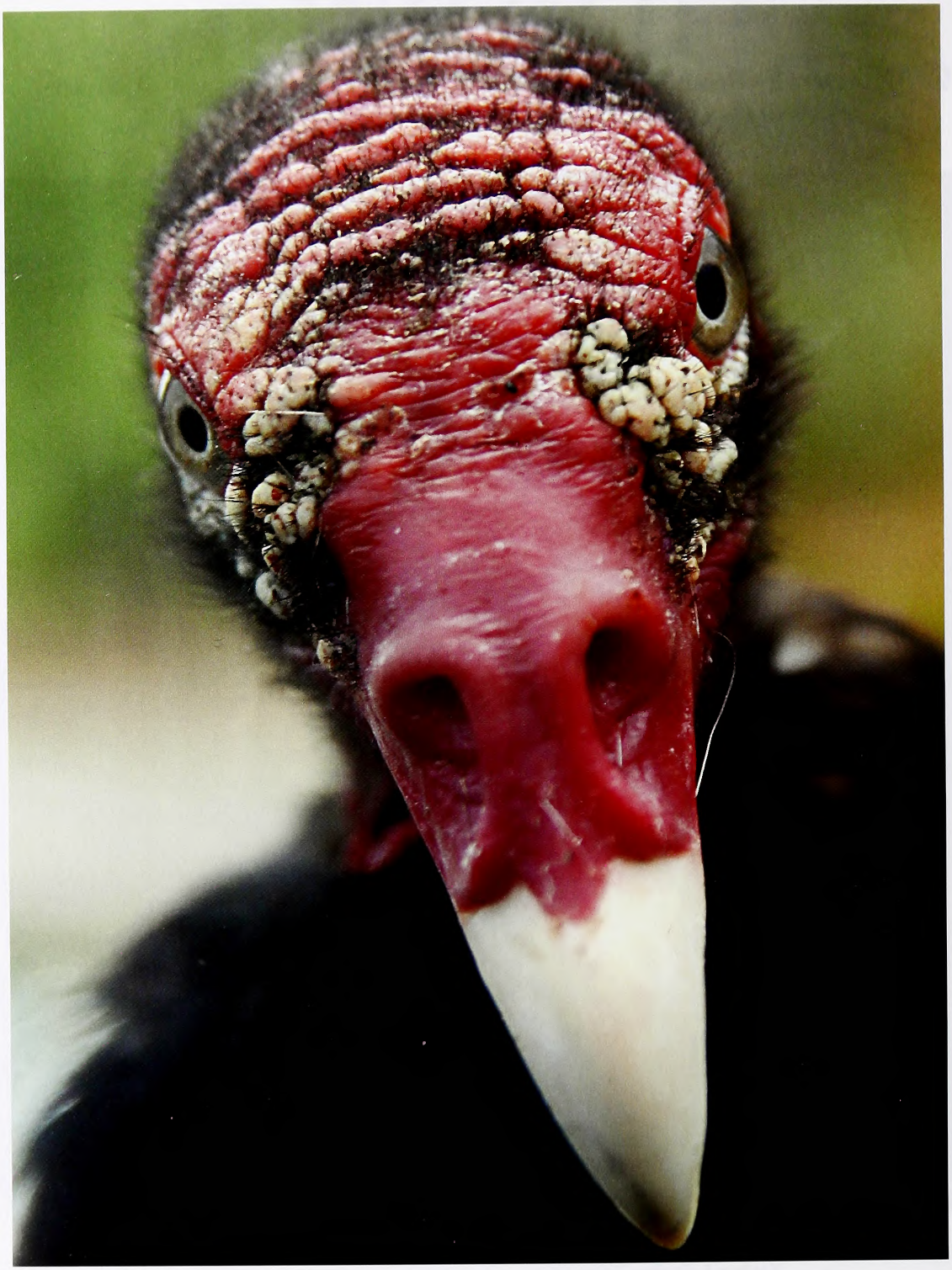
All winning photographs may be seen on exhibit through March at the museum thanks to our exhibition sponsor, JW Photo of Raleigh. Various North Carolina state parks will exhibit selected photos from the competition throughout the year. Details and rules for the 2010 competition will be posted on www.ncwildlife.org in May, and entries will open on June 1. To see technical specs for many of the winning photos, visit the gallery on our web site.

—Greg Jenkins

GRAND PRIZE WILDLIFE IN NORTH CAROLINA 2009 PHOTO COMPETITION

Kaylyn J. Gruber, Belmont
Brown-headed cowbird chick, Gastonia

Gruber had to take this photo quickly. The cowbird chick acted injured and did not seem able to fly, but Gruber was between high school classes and had only a few minutes to get the shot. "I think that settings were probably on something automatic," she said. "I didn't have any time to make adjustments on the camera. I just ran to get the camera, turned it on, and started snapping." Gruber chose to convert the image to black-and-white to convey a serious tone. "Instead of saying, 'Oh, what a cute bird,'" she said, "someone might consider its pain and its story."



BIRDS **FIRST PLACE**

Jonathan Page, Raleigh
Turkey vulture, Raleigh

Page credits his habits of having a camera handy and being ready for anything for allowing him to capture this winning image from his Raleigh office building. When he was told that a turkey vulture was sitting outside a co-worker's window, Page swapped his primary lens for a macro. Page had his lens pressed against the window glass when the vulture turned to face him, resulting in this shot.

BIRDS **SECOND PLACE**

Jared Lloyd, Kill Devil Hills
Black-crowned night heron, Outer Banks

On one of his many kayak expeditions to photograph birds, Lloyd, the 2008 Grand Prize winner, spotted this night heron. Perched in the sunlight in the midst of the shade of live oak limbs, it was a perfect photo subject. He was able to approach closely in his boat without disturbing the bird.

BIRDS **THIRD PLACE**

Ed Erkes, Goldsboro
Belted kingfisher, Johnston County

This shot turned out to be a lot of work for Erkes, who spent parts of several days simply observing nesting belted kingfishers at a sand and gravel pit at Howell Woods. After seeing how frequently the birds returned to their nest, Erkes set up a couple of perches which the birds took to using. He tried without much success to photograph the birds for two mornings, but was successful on his third attempt.

BIRDS **HONORABLE MENTION**

Dana Henderson, Beaufort
Juvenile great horned owls, Newport

Henderson captured this image of a pair of juvenile great horned owls before the birds were released in September from the Outer Banks Wildlife Shelter. Henderson had entered the birds' enclosure to feed and clean them and took her camera along for a quick photo session.

BIRDS **HONORABLE MENTION**

Jesse Ivan, Zirconia
Killdeer in snow, Cataloochee Valley

Most people associate killdeer, a year-round resident of our state, with spring and summer grasslands. Ivan found this bird in the mountains in early December of 2008. Using his car as a blind, Ivan spent several hours working to capture this gelid image.

MAMMALS **FIRST PLACE**

Andy Walker, Asheville
Eastern chipmunk, McLeansville

Walker was attending a photo workshop led by Jividen's Naturally Wild Photo Adventures, held in the back yard of 2007 Mammals category winner Gary Carter. This picture was taken from Carter's permanent photo blind with Walker's camera mounted on a tripod and using a flash off the camera.

MAMMALS **SECOND PLACE**

Wes Gubitz, Wilmington
Red fox, Hertford County

Gubitz, a past winner in the Mammals category, captured this photo on one of his many photo outings near a friend's farm. The fox had been seen a number of times near the forest edge, but for this photo taken early in the morning, it paused in exactly the right place. The fox's thick coat echoes the autumn colors of the November woods.

MAMMALS **HONORABLE MENTION**

Jackie Orsulak, Duck
Black bear, Alligator River National Wildlife Refuge

Orsulak has spent so much time photographing animals at the refuge, she recognizes certain individuals. This bruin is one of many she has photographed multiple times. "It is a wonderful, magical wildlife world," Orsulak says of the refuge and its residents. "We must view them from a distance with respect."

MAMMALS **HONORABLE MENTION**

Jay Wickens, Powells Point
Wild horse, Corolla

A frequent photographer of the horses of the northern Currituck banks, Wickens was a bit wary of taking pictures of a horse's rear end. But as the animal continued to walk away, he liked the composition with the horse's hoof prints trailing behind and captured this photo.

MAMMALS **THIRD PLACE**

Bill Edmonds, Williamston
White-tailed deer, Pocosin Lakes National Wildlife Refuge

Edmonds had scouted the refuge for weeks in his search for deer and bears to photograph. This young buck, with antlers still covered in velvet, gradually became familiar with the photographer and allowed him to approach and take photos for 15 minutes just before sunset.

REPTILES & AMPHIBIANS **FIRST PLACE**

Jared Lloyd, Kill Devil Hills
American alligator, Merchants Millpond State Park

Lloyd visited Merchants Millpond last May when he saw this alligator, the only one he had seen thus far. Lloyd followed the alligator about half a mile through the swamp until the animal crawled onto an old log. With the water temperature still fairly chilly and the alligator perhaps a bit slower because of it, Lloyd was able to move and take a shot from a position lower than the animal.

REPTILES & AMPHIBIANS
SECOND PLACE

Gene Furr, Raleigh
American alligator, Southport

On a day trip to some wetlands near Southport, Furr spied this alligator sunning itself. "The autumn leaves were at their peak and reflecting in the water," Furr said. "To get the angle I wanted, I had to lie on the ground to be on the same level as the alligator. I waited for almost an hour for the alligator to float into the reflections of color leaves."

REPTILES & AMPHIBIANS
THIRD PLACE

Guy Livesay, Williamston
Green treefrog, Martin County

Like many of the better shots he's taken, said Livesay, this photograph came about unexpectedly. As he was working among some canna lilies, Livesay spied this little green treefrog and retrieved his camera and tripod. Eventually he was able to stick the lens of the camera into the canna funnel to snap this photograph.

REPTILES & AMPHIBIANS
HONORABLE MENTION

Guy Fortier, Apex
Snapping turtle, New Hill

While hiking the trails of Harris Lake County Park, Fortier spotted what looked like a rock covered with moss at the top of a steep pond bank. Realizing that it was a snapping turtle covered in duckweed, he lay down on the ground and inched closer until the turtle's image filled the frame at 400 mm.

REPTILES & AMPHIBIANS
HONORABLE MENTION

LeeAnne Emrick, Bridgeport, W.Va.
American alligator, Winnabow

On the last day of her vacation, Emrick visited Orton Plantation before heading back home to West Virginia. After waiting out a thunderstorm in the chapel on the plantation grounds, Emrick came upon this alligator in a lagoon.

INVERTEBRATES **FIRST PLACE**

Nicholas D'Amato, Durham
Water strider, McDowell County

D'Amato took this shot while exploring around Andrews Geyser and Mill Creek on a fall weekend trip to Asheville. He noticed the bright highlights created by the sun reflecting in the tiny indentations made by the water strider's legs on the surface of the water, and had time to fire off only two exposures before the insect moved on. The leaves at the bottom of the creek paired with the low warm sunlight give a great autumn feel to the picture.

INVERTEBRATES **SECOND PLACE**

Robert W. Stewart, Thomasville
Housefly, Thomasville

Stewart captured this image while shooting butterflies in his back yard. The interloping fly landed in the field of view, and Stewart fired off this razor-sharp shot with his camera in one hand and his flash in the other.

INVERTEBRATES **HONORABLE MENTION**

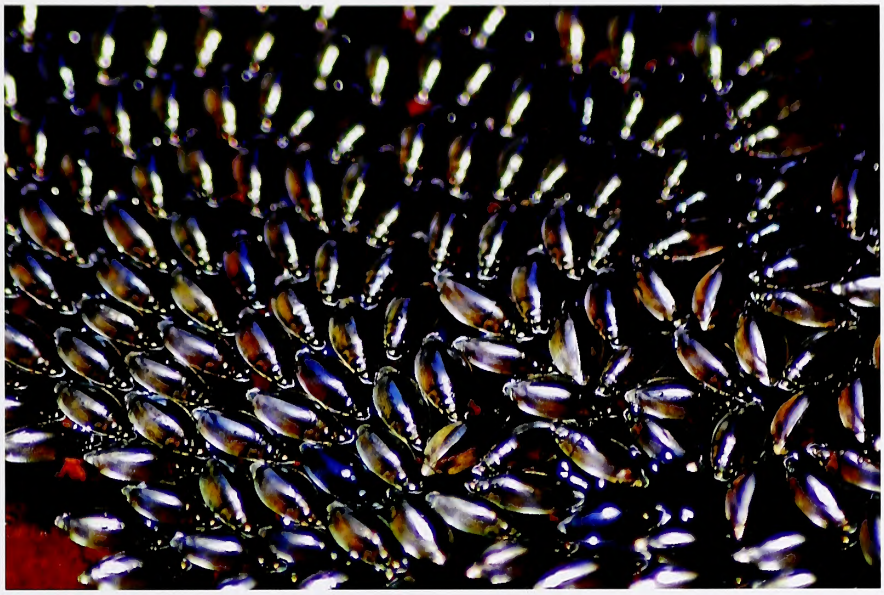
Leann Greene, Morganton
Spider on web, Morganton

Greene, the 2008 Invertebrates category winner, lay in a wet horse pasture resting on her elbows to get this image. Because she used extension tubes for shallow depth of field, she had to get very close to the spider. "It takes a few tries to find a spider that doesn't jump out of the web when you get close to it," Greene said.

INVERTEBRATES **HONORABLE MENTION**

Joshua Doby, Zebulon
Whirligig beetles, Zebulon

Doby captured the interesting grouping behavior of whirligig beetles in this photo. The shiny, metallic-looking aquatic beetles live on the water's surface, where they huddle together to avoid predation.



INVERTEBRATES **THIRD PLACE**

Bradley Lewis, Durham
Honeybees, Raleigh

Lewis visits J.C. Raulston Arboretum on the N.C. State University campus frequently and had been working up the nerve to get macro shots of single honeybees entering and exiting a hive. He got a little too close and was stung, at which point he decided to take group shots with a zoom lens. He liked the way this photo represents the bees functioning as a colony rather than as individual workers.

WILD PLANTS **FIRST PLACE**

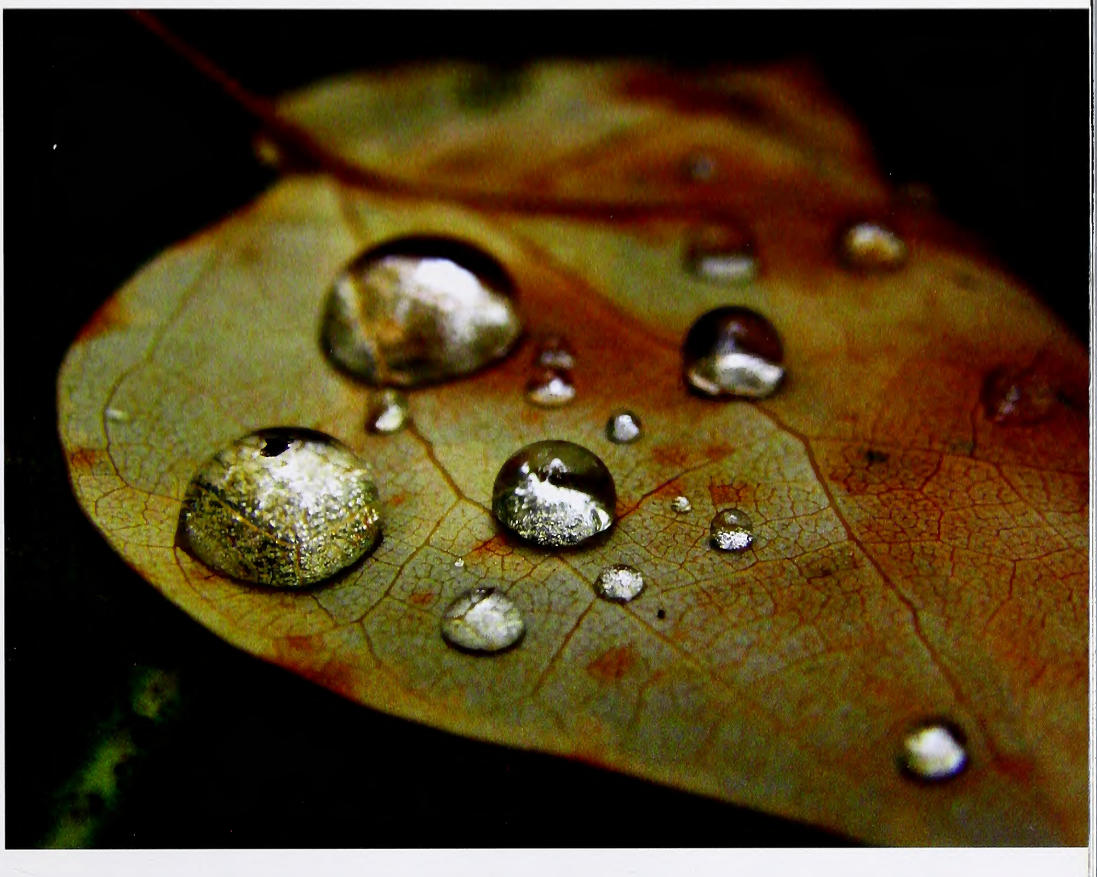
L. Branson Phillips, Durham
Dew on dandelion, Durham

Phillips was familiarizing himself with a new 100mm macro lens when he took this winning photograph of a common dandelion with dew on the seed head. "I was playing around with depth of field during the time I took it," Phillips said. "I was just seeing what the lens would do."

WILD PLANTS
SECOND PLACE

Leslie Bilbrey, Sylva
Water droplets on poplar leaf,
Great Smoky Mountains National Park

During a walk in the Great Smoky Mountains National Park in October 2008, Bilbrey's eye was attracted by this poplar leaf lying on the ground and adorned with raindrops.



WILD PLANTS
THIRD PLACE

Wendy Gem, Wake Forest
Moss close-up, Wake Forest

Gem used a field scope with her camera for magnification in natural light to capture this unique photograph of moss. "I enjoy photographing the plants that many people overlook, and I think that mosses have such unique form," Gem said. "They are in the division of bryophytes, or early terrestrial plants, which explains why they prefer moist places."

WILD PLANTS
HONORABLE MENTION

Ronnie Hodge, West Union, S.C.
Bloodroot, Pisgah National Forest

Hodge, his wife and some friends were hiking along Avery Creek in Pisgah National Forest looking for early wildflowers. They had seen few until they reached Twin Falls, where they found a hillside covered in bloodroot. "There was one bloom that stood out to me," Hodge said, "and I loved the way the light was hitting it."

WILD PLANTS
HONORABLE MENTION

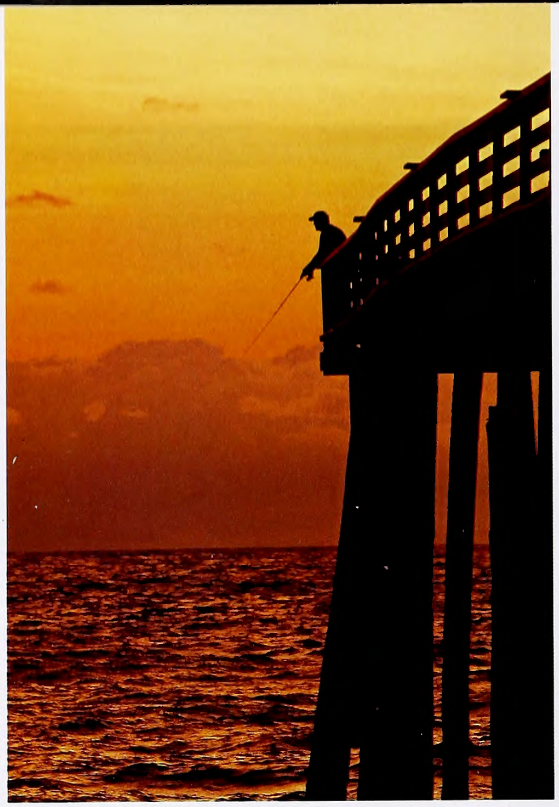
Noah Boyd, Willow Spring
Dew on grass, Willow Spring

After photographing a sunrise, Boyd noticed this patch of dew-soaked grass. "I laid on the wet ground, turned on the macro and snapped the shot," he said. The judges agreed that the scene was eye-catching.

OUTDOOR RECREATION **FIRST PLACE**

Nicholas D'Amato, Durham
Surf fisherman, Southern Shores

D'Amato was vacationing on the same street as this angler and struck up a conversation with him, after which D'Amato headed in for breakfast and the fisherman settled in for a pleasant morning. "His pose, holding his pipe while staring at his fishing rod hopefully, yet not impatiently, reminds me of the slower pace of life and the calm I feel while on the Outer Banks," D'Amato said.



OUTDOOR RECREATION
SECOND PLACE

Daniel Waters, Point Harbor
Pier fisherman, Kitty Hawk

Waters initially went out on Kitty Hawk Pier to take photos, but the angler kept getting in his way. Discouraged, he set up his tripod on the beach and realized that the same fisherman was now the subject of the photo. Early morning light and choppy seas completed the pleasing composition.

OUTDOOR RECREATION
THIRD PLACE

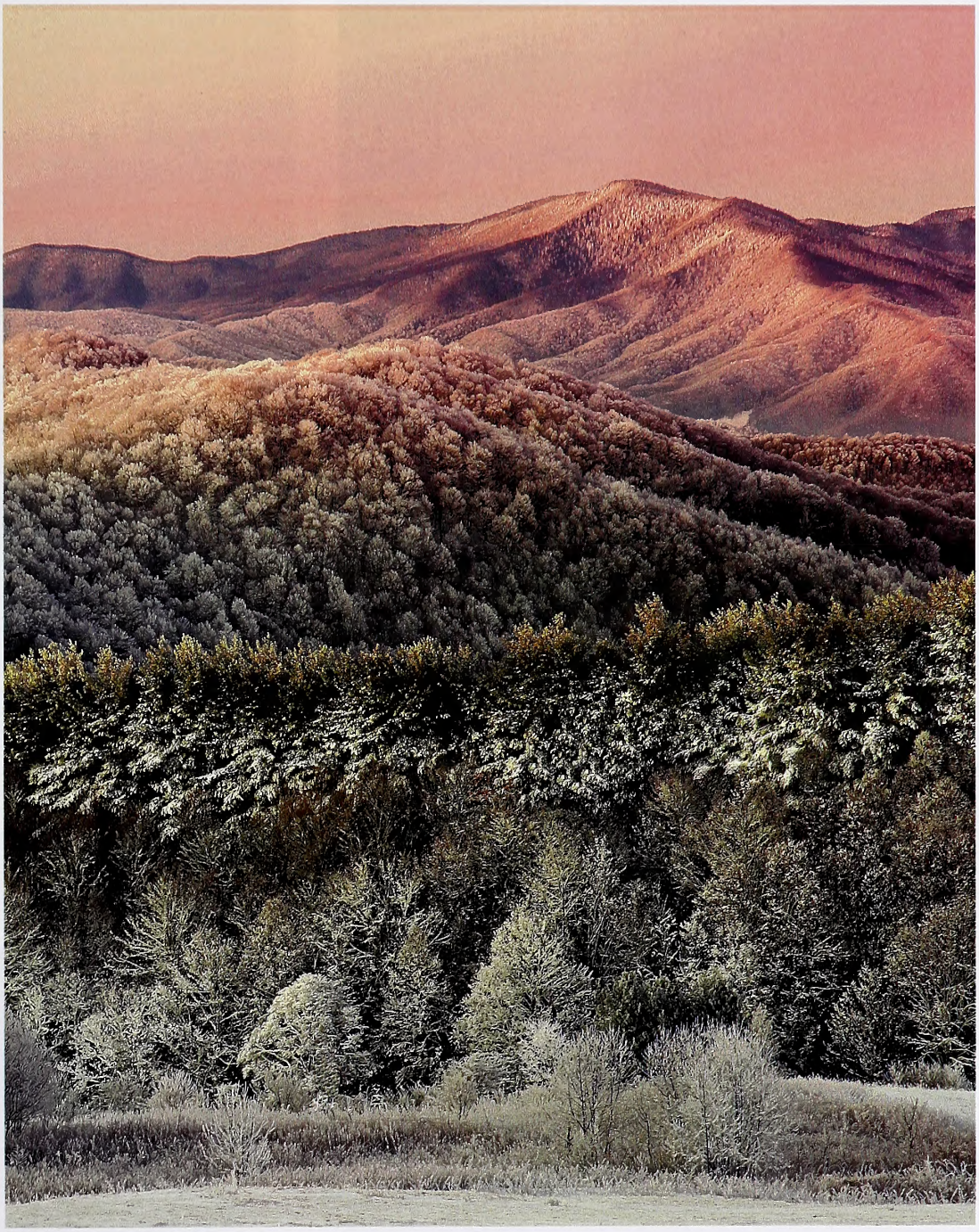
Robert Daniel Swords, Raleigh
Skimboarder, Cape Lookout

Swords was vacationing with family last June on the ocean side of Cape Lookout when he took this photo of his younger brother preparing to skimboard in the surf. The unique perspective illustrates what is about to happen in a simple, graphically pleasing way.

OUTDOOR RECREATION
HONORABLE MENTION

Martha Bennett Metzler, Winston-Salem
Pointer, Clemmons

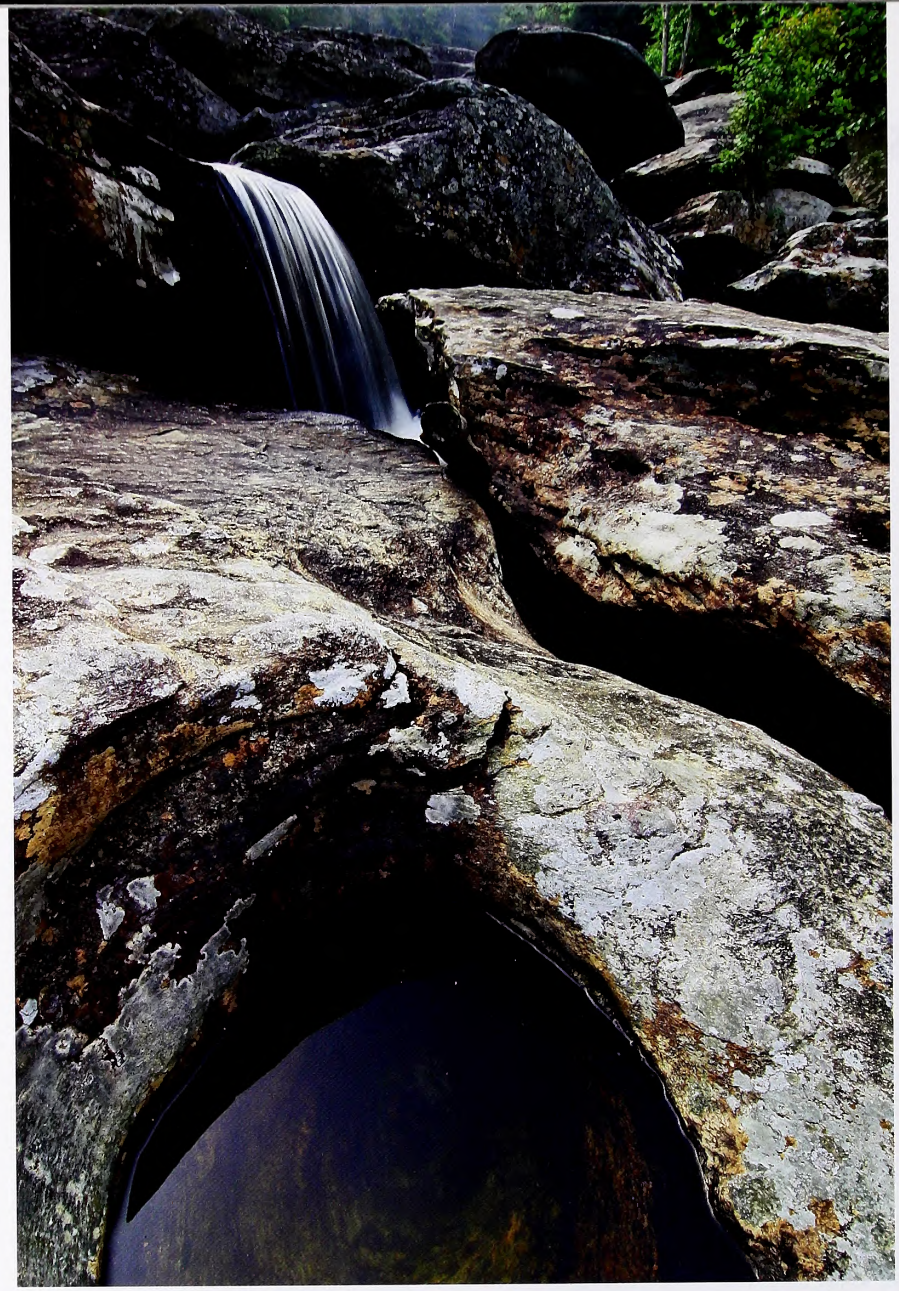
Metzler, a quail hunter, was enjoying a day at her father's house on the Yadkin River when her pointer, Roy, locked on point. Because it was March and quail season was over, Metzler captured Roy in action. Her photograph brims with late-winter sunlight and the colors of the season.



PEAKS, VALLEYS & PLAINS **FIRST PLACE**

Scott Hotaling, Raleigh
Sunrise at Max Patch, Madison County

After watching many winter sunrises at Max Patch in Madison County, Hotaling had a shot in mind that he wanted. "I know how the light falls on the surrounding peaks," he said, "but clouds and fog hadn't cooperated until this particular day." This is the third straight winning photo in Peaks, Valleys & Plains for Hotaling.



PEAKS, VALLEYS & PLAINS
SECOND PLACE

Dale King, Sugar Mountain
Hebron Colony Falls, Boone

King went to Hebron Colony Falls early to avoid the crowds that visit this waterfall. "I also took advantage of the soft light that was available before the sun rose above the trees," King said. "I was lucky on this day to have the place to myself for about an hour."

PEAKS, VALLEYS & PLAINS
HONORABLE MENTION

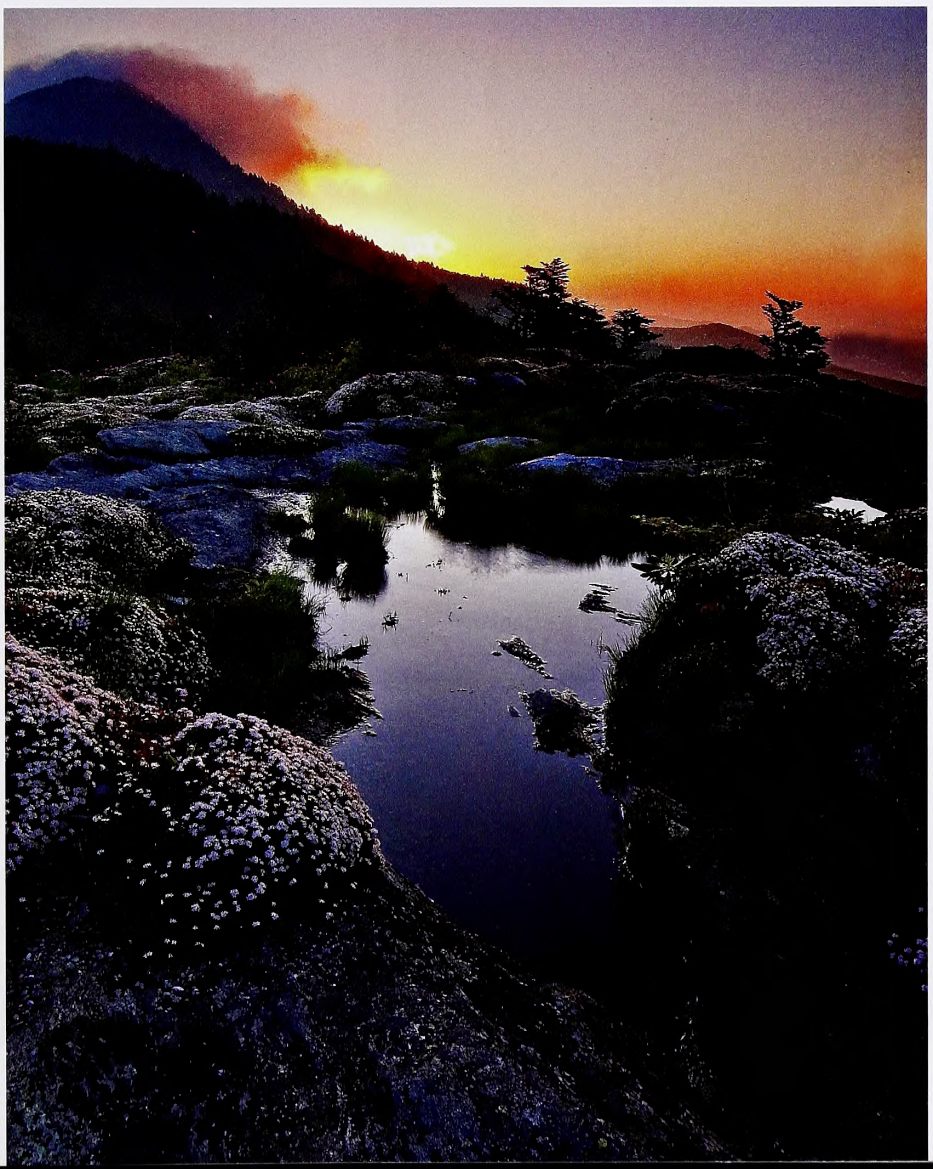
Julian De La Rosa III, Apex
Sunrise at Hatteras Island Fishing Pier, Rodanthe

A pier at sunrise strikes something elemental in most anglers, with its promise of good fish and good times. De La Rosa captured the beauty and moodiness of piers with this shot at Rodanthe on the Outer Banks.

PEAKS, VALLEYS & PLAINS
HONORABLE MENTION

Chris Ogden, Durham
Sunrise, Pocosin Lakes National Refuge

While waiting in a drainage ditch to photograph thousands of snow geese descending on fields at Pocosin Lakes, Ogden was treated to this frigid sunrise on a winter morning and preserved the image with his camera. "It can be pretty cold squatting in the ditch in the darkness," Ogden said, explaining that one has to be in the ditch at least an hour before sunrise to be sure not to spook the wildlife, "but it was more than worth it to see the sky catch fire in the predawn."



PEAKS, VALLEYS & PLAINS
THIRD PLACE

Steven Gold, Hickory
Sunrise, Grandfather Mountain

Grandfather Mountain is a frequent destination for photographers. Although Gold didn't catch the sunrise in this puddle as he had hoped, his photograph at sunrise after a rainy night turned out extremely well.

ANIMAL BEHAVIOR **FIRST PLACE**

Chuck Carmack, Wilmington
Bathing robin, Wilmington

Carmack has bird feeders, a birdbath and a butterfly garden in his back yard to attract all kinds of avian photo subjects. While taking pictures in the butterfly garden last August, he noticed the bathing robin and was able to snap this image, freezing the bird in the midst of its grooming ritual.

ANIMAL BEHAVIOR
SECOND PLACE

Ed Ziegler, Raleigh
Orb spider with prey, Raleigh

While visiting the office of Durant Nature Park in August, Ziegler learned that a number of orb weaver spiders had constructed webs in the park's bog area. After several visits, he was able to capture this spider in the act of enveloping a prey insect in silk for a later meal.

ANIMAL BEHAVIOR
THIRD PLACE

Emmett Westbrook, Morehead City
Snapping turtle attacking cattle egret, Harkers Island

Westbrook was visiting the Core Sound Waterfowl Museum when he saw a cattle egret thrashing around in the pond behind the museum. Thinking initially that the bird was tangled in discarded fishing line, he soon realized that something below the surface was moving with the egret. Westbrook took 200 photos over the course of a two-hour battle, after which the egret finally broke free but proved to be fatally wounded.

YOUTH PHOTOGRAPHER 13–17
FIRST PLACE

Jake Orr, Topsail Beach
Jolly Roger Pier, Topsail Beach

Jake, 15, was looking for a new twist on the typical pier photo when he took this picture. He set up his camera on a tripod under the pier and used a 30-second exposure to capture the effect of the pier lights dancing on the water and illuminating the structure.

YOUTH PHOTOGRAPHER 13–17
SECOND PLACE

Lindsay Brooke Myers, Alexander
Lightning, Alexander

Lindsay, 17, has been fascinated with thunderstorms since she was small. She captured this June storm by setting up her tripod in a car parked at the end of a road overlooking the French Broad River and shooting out of an open window. This was her first attempt at photographing lightning.

YOUTH PHOTOGRAPHER 13–17
THIRD PLACE

Jake Orr, Topsail Beach
Peregrine falcon, Topsail Beach

Jake was observing terns and sea gulls on the beach on an April morning, and was surprised when he turned around to see this peregrine perched 10 feet behind him. He immediately lay down and began taking photos in the golden light. "I assume it was taking a rest after hunting terns that morning," he said.

YOUTH PHOTOGRAPHER 13–17
HONORABLE MENTION

Landon Carter, Cary
Ring-billed gull, Corolla

Landon, 13, was taking photos while walking on the beach with family last April. He was attempting to get a close-up of this gull when he captured it taking flight.

YOUTH PHOTOGRAPHER 13–17
HONORABLE MENTION

Nathanael Gass, Durham
Carolina anole, Asheboro

Perennial competition winner Nathanael, 16, was visiting the N.C. Zoo in February 2008 when he captured this photo of an anole feasting on a cricket.

YOUTH PHOTOGRAPHER 13–17
HONORABLE MENTION

Mark Tiffany, Cary
Bass angler, Lake Mattamuskeet

Mark, 16, was traveling to the Outer Banks with his father when they stopped to take photos of the sunset. An angler soon entered the area and caught a nice bass.

YOUTH PHOTOGRAPHER 12 & UNDER
FIRST PLACE

Hannah Ziegler, Raleigh
Hummingbird moth, Raleigh

Photographic skills apparently run in the Ziegler family. Hannah, 8, is the granddaughter of Ed Ziegler, the Grand Prize winner in 2007 and runner-up in the Invertebrates category this year. Ed took Hannah with him to Durant Nature Park where she borrowed his camera to take this winning image of a hummingbird moth.

YOUTH PHOTOGRAPHER 12 & UNDER
SECOND PLACE

Nicole Howren, Cary
Bee on coreopsis, Blue Ridge Parkway

Nicole, 10, used a 55–200 mm lens to take this photograph of coreopsis along the Blue Ridge Parkway. "The zoom kept me safe from the bees and the cliff," she said.

YOUTH PHOTOGRAPHER 12 & UNDER
THIRD PLACE

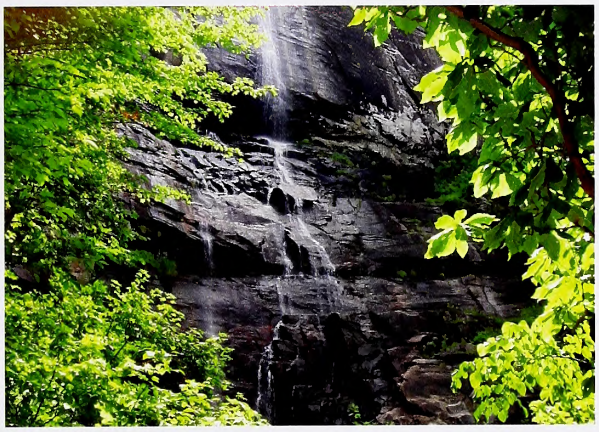
Nancy Samantha Halstead, Walkertown
Treefrog, Walkertown

Nancy, 11, didn't have to travel far to earn third place—she shot this image of a treefrog on a chain in her yard last summer.

YOUTH PHOTOGRAPHER 12 & UNDER
HONORABLE MENTION

Rachel Layko, Apex
Sunrise, Nags Head

She was unable to see any hatching turtles as she had hoped, but Rachel, 12, did manage to shoot this lovely photograph of a sunrise at Nags Head last August.



YOUTH PHOTOGRAPHER 12 & UNDER
HONORABLE MENTION

Olivia Jordan Leigh, Pasadena, Md.
Hickory Nut Falls, Rutherford County

Precocious photographer Olivia, only 4, earned an honorable mention with this scenic photograph taken on a family camping trip near Saluda.

YOUTH PHOTOGRAPHER 12 & UNDER
HONORABLE MENTION

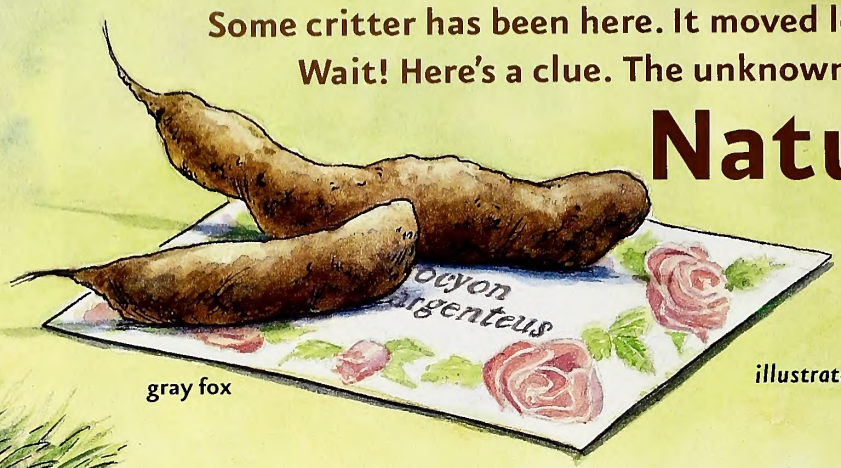
Nicole Howren, Cary
Sunset, Craggy Cove

On the same day as she took the photo of coreopsis (top left), Nicole captured this view of Craggy Cove from an overlook along the Blue Ridge Parkway.

Some critter has been here. It moved leaves but left no tracks. Wait! Here's a clue. The unknown visitor left one of

Nature's Calling Cards

written by Roger A. Powell
illustrated by Amelia Hansen / nature activity by Anne M. Runyon



gray fox

Years ago, when a person went to the house of a friend or acquaintance but found that friend not at home, he might leave a calling card. This was a small card, like today's business cards, that left word that he had been there and gone. Scats, another name for feces left by animals, work the same way.

ruffed grouse (50%)

WHO WAS THAT?

Some animals leave scats of such distinctive shapes that the scats are obvious calling cards. In winter, deer pellets (their scats) are oval, usually about 1 cm long, and filled with fibrous, undigested parts of plants. Rabbit pellets are smaller than deer pellets, almost cubical in shape, and also filled with fibrous material. Grouse scats are fibrous but elongate, light brown and often fall apart if disturbed. Toad scats are about as thick as a lead pencil, glossy black and filled with insect parts. In most places, these scats are easy to identify.

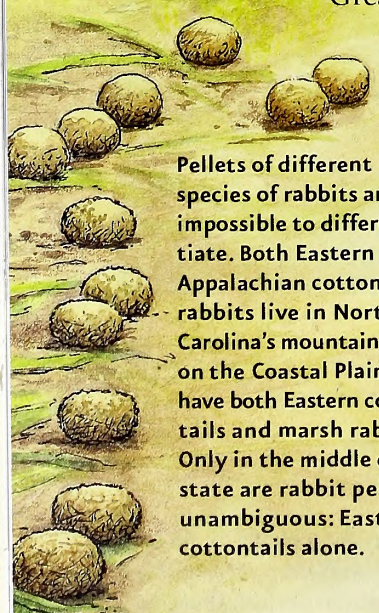
toad (50%)

NOT PERFECT

Identifying scats is an imperfect art. Elk were recently reintroduced to Great Smoky Mountains National Park. Elk pellets look almost exactly like deer pellets but average larger in size. Nonetheless, some elk pellets match deer pellets exactly. Where both deer and elk live, big pellets mean that elk have been around, small pellets document the presence of deer, but medium-sized pellets can leave you uncertain.

Naturalists often use scats of carnivores to learn which of these predators live where. The shapes of carnivores' scats have distinctive features that allow identification: Fox scats are tapered, bobcat scats are segmented, and raccoons leave finger-sized scats on logs around ponds and streams. Unfortunately, these shapes and other characteristics are not always diagnostic. Bobcats sometimes defecate on logs near streams, like raccoons. Not all fox scats taper. And the scats of gray foxes, red foxes, coyotes and red wolves are all similar and overlap in sizes.

Usually, though, scats from animals of different groups are distinctive. Although deer scats may be confused with elk scats, you will never confuse them with fox scats. But even this rule is not hard and fast. Mink scats can look almost exactly like toad scats and are often found on rocks near water, as are toad scats. In addition, mink scats often contain fish scales, which can resemble insects parts in a quick glance. The scats of most bats resemble mouse scats. And the scats of most insects resemble large grains of ground black pepper.



Pellets of different species of rabbits are impossible to differentiate. Both Eastern and Appalachian cottontail rabbits live in North Carolina's mountains, and on the Coastal Plain we have both Eastern cottontails and marsh rabbits. Only in the middle of the state are rabbit pellets unambiguous: Eastern cottontails alone.

bat

mink

skunk (50%)

field mouse (200%)

HELP IS ON THE WAY

Luckily, other information often helps with identification. Foxes usually urinate close to their scats and their urine has a skunk-like odor. In addition, new technology can help us. When an animal defecates, cells sloughed from its digestive tract are incorporated into the scat, leaving a DNA signature. Analyzed in a genetics laboratory, DNA can identify the species, sex and sometimes even the individual who left the scat.

weasel

red squirrel

I WAS HERE

Many mammals leave scent in obvious places to communicate with conspecifics (other members of their species). Scats are regularly used as scent marks, along with urine and secretions from glands, such as the anal glands of foxes and wolves and weasels, and the castor glands of beavers. When scats are used as scent marks, they are placed on top of rocks, logs, stumps or other prominent places. Deposited in such obvious places, these scats are easy to see but, more importantly, their scents waft on the wind and spread their messages.

What can the scents of a scat say? Lots: "I own this territory." "I am a female" (or male). "I am looking for a mate." "I am young and strong." "I am old and experienced." "I am subordinate, not looking for trouble, and won't be here long."

The feces of most songbirds are splotches of white goo, often with a glob of dark goo. These really are scats but look unlike what we generally consider as scats. When birds eat lots of berries, their scats turn blue or purple or red instead of white.

black bear (25%)

deer, summer and winter (50%)

bobcat (50%)

LEFTOVERS

For centuries, people have looked in scats to learn what animals eat. Scats contain parts of food that can not be digested. Pieces of bone, hair, feathers and scales fill the scats of carnivores and can be used to identify prey. Scats of shrews, moles and toads contain pieces of insect exoskeletons and hard parts of earthworms. Plant bud scales and bits of bark and wood fill scats of deer, grouse and squirrels in winter.

Some food remains in scats are easy to identify after some practice. The teeth of each rodent species are distinctive and can be identified (with lots of practice). Deer have hollow guard hairs that kink like a straw when bent and show that a red wolf, coyote or bobcat has dined on a deer. Most bones of birds are hollow. And fish scales are, well, fish scales.

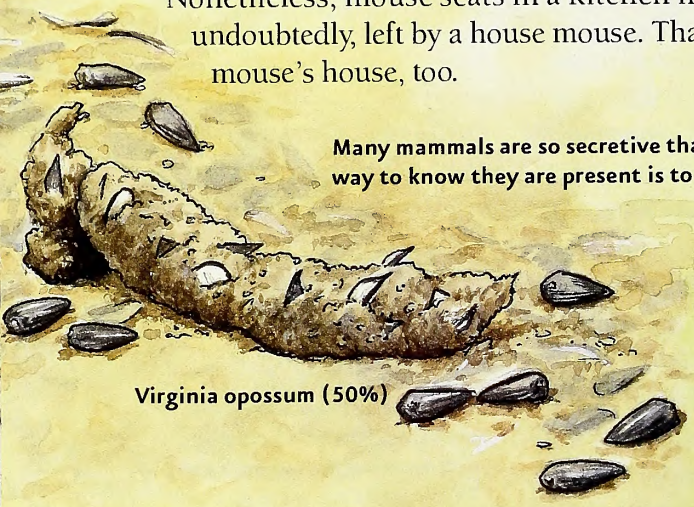
raccoon, rain-washed (50%)

red wolf, old (50%)

HABITAT IS WHERE IT'S AT

The more time an animal spends in a particular type of habitat, the more likely it is to leave a scat there. Thus, wildlife biologists count scats in different places, note the habitat, and learn where critters spend their time. Some animals associate so much with specific places that knowing where a scat is helps to know what animal left the scat. The scats of all mice resemble small, black grains of rice. Nonetheless, mouse scats in a kitchen in town were, undoubtedly, left by a house mouse. That house is the mouse's house, too.

house mouse (200%)



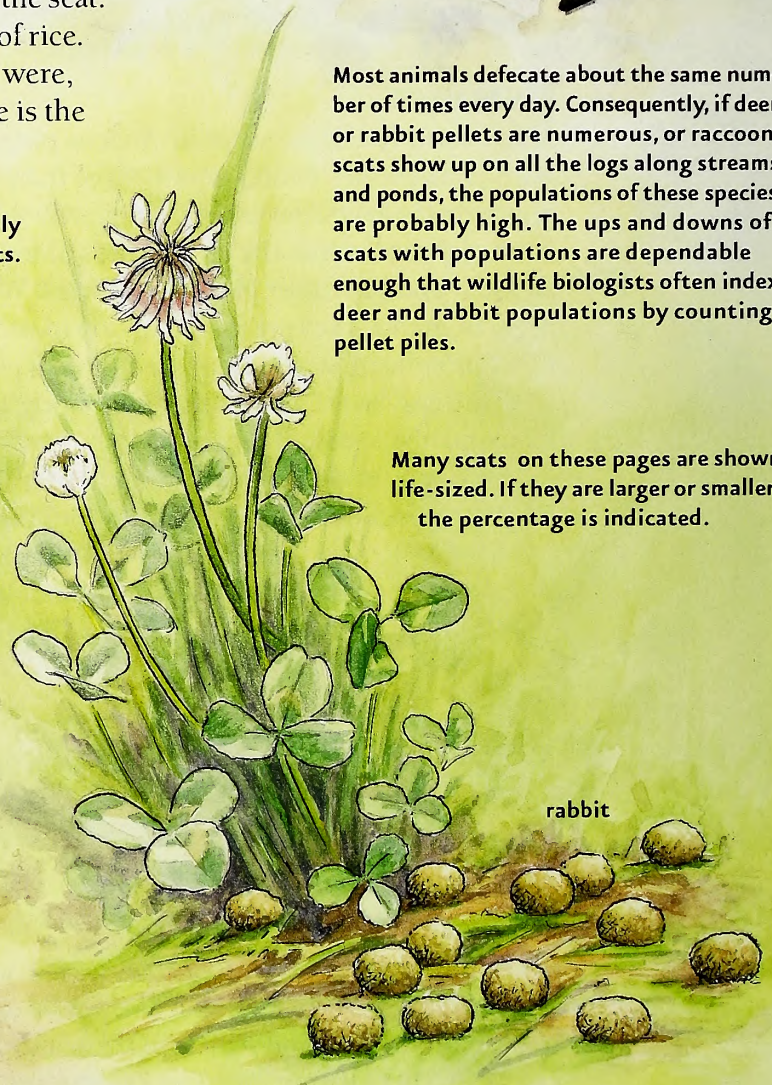
Virginia opossum (50%)

Many mammals are so secretive that the only way to know they are present is to find scats.

Most animals defecate about the same number of times every day. Consequently, if deer or rabbit pellets are numerous, or raccoon scats show up on all the logs along streams and ponds, the populations of these species are probably high. The ups and downs of scats with populations are dependable enough that wildlife biologists often index deer and rabbit populations by counting pellet piles.

Many scats on these pages are shown life-sized. If they are larger or smaller, the percentage is indicated.

Owl pellets might look like scats but they are different. Owls cast up (regurgitate or throw up) food parts that they can not digest, producing pellets that resemble scats and that can be used like scats to identify owl species, to learn what owls eat, and to learn where owls spend time.



rabbit

Get Outside

If you find a scat, look inside it to learn what the animal who left it has eaten. You can use a stick to pick the scat apart. If you have rubber gloves, wear them. Scats sometimes carry eggs of parasites, so wash your hands when you are done.

Many field guides to scats and tracks show drawings or photographs of scats that can help you to identify and remember the distinct shapes of scats. Go for a hike and take a field guide. Make note of the habitat where you find the scats of different species. If you do not have a field guide with you, you can bring scats home in plastic bags. Mark each bag with when and where you found the scat. Remember to include information that might help you identify the scat, such as whether it was found on a log or on a rock, found near water or found with lots of other scats.

Read and Find Out

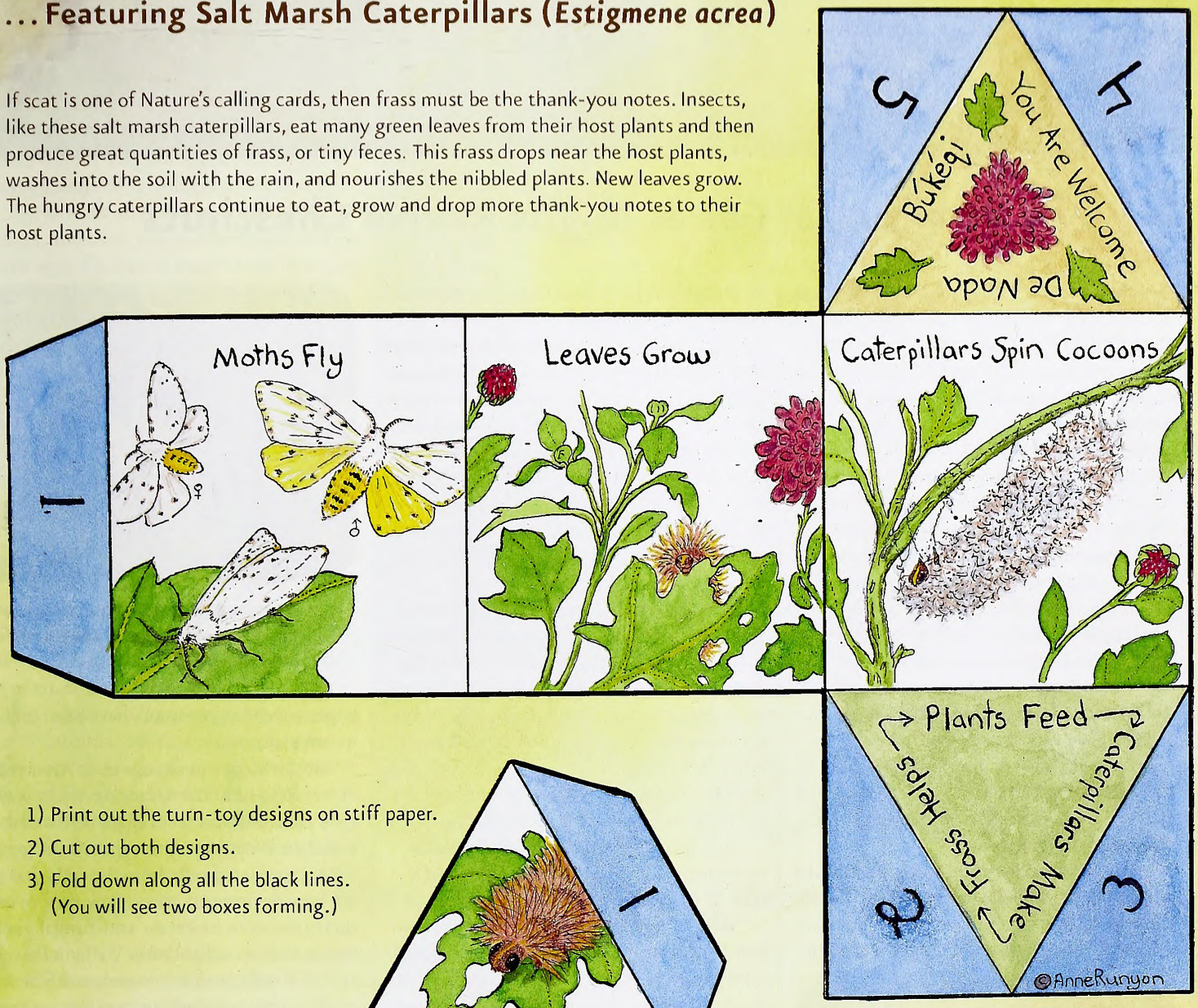
- "Animal Tracks & Signs" by Jinny Johnson and John A. Burton, National Geographic, 2008.
- "Mammal Tracks & Sign; A Guide to North American Species" by Mark Elbroch, Stackpole Books, 2003.
- "The Scoop on Poop" by Wayne Lynch, Fifth House Publishers, 2001.
- "Tracks, Scats and Signs" by Leslie Dendy, NorthWord Books, 1998.

Find out more about Project WILD Workshops and literature at the Wildlife Commission's Web site at www.ncwildlife.org.

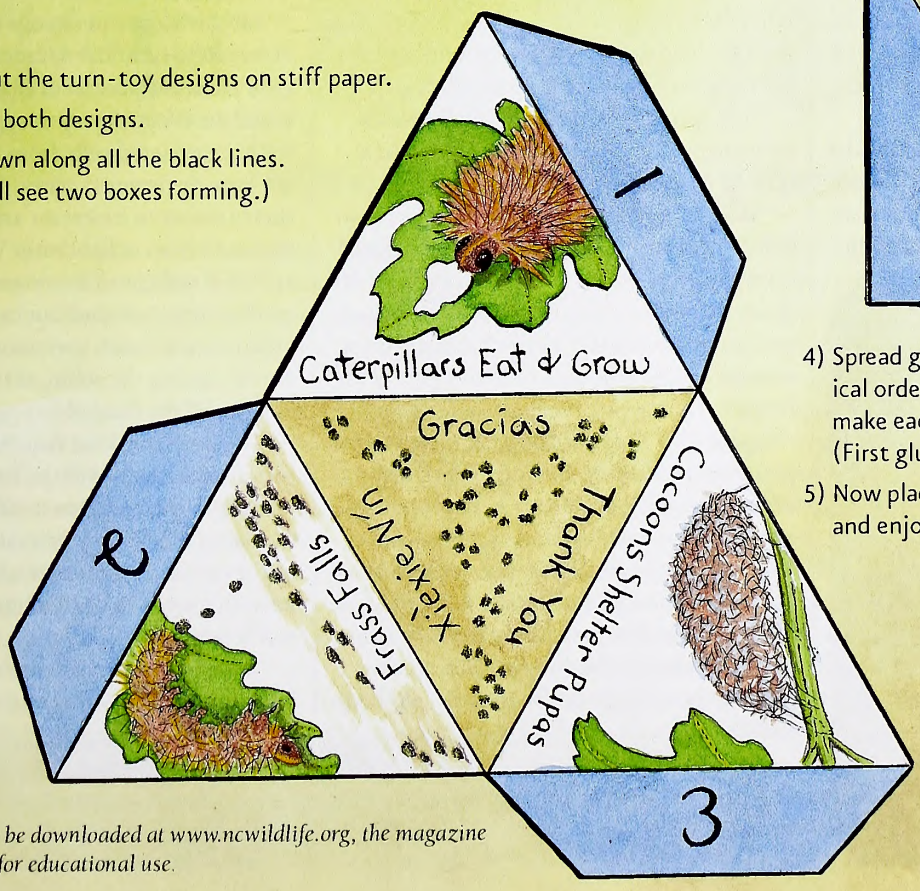
Make a Frass Turn-Toy

... Featuring Salt Marsh Caterpillars (*Estigmene acrea*)

If scat is one of Nature's calling cards, then frass must be the thank-you notes. Insects, like these salt marsh caterpillars, eat many green leaves from their host plants and then produce great quantities of frass, or tiny feces. This frass drops near the host plants, washes into the soil with the rain, and nourishes the nibbled plants. New leaves grow. The hungry caterpillars continue to eat, grow and drop more thank-you notes to their host plants.



1) Print out the turn-toy designs on stiff paper.
2) Cut out both designs.
3) Fold down along all the black lines. (You will see two boxes forming.)



4) Spread glue on the white tabs in numerical order and glue shut, one by one, to make each box. (First glue tab 1, then 2, and so on.)
5) Now place the pyramid on top, turn and enjoy.

This activity may be downloaded at www.ncwildlife.org, the magazine page, and copied for educational use.

Antifungal Genes Might Revive Chestnuts

In their prime, the American chestnut trees stood 100 feet tall and 6 feet wide. Now, they're typically no bigger than shrubs, thanks to a fungal disease that spread down the East Coast decades ago, virtually wiping out the hardwood tree.

But researchers in the University of Georgia Warnell School of Forestry and Natural Resources, with support from ArborGen LLC, a leader in tree improvement and commercial production of trees, have developed a method for inserting antifungal genes into the tree's DNA. They hope the new genes will fight off the fungal disease and help restore the American chestnut to its former glory.

The results of Scott Merkle's 20-year effort are detailed in a new paper published in the journal *Plant Cell Reports*, where he and associates Gisele Andrade and Joe Nairn describe the system they developed to insert new genes into the tree's DNA and to propagate trees that carry the genes.

"The gene transfer system described in the new paper has already been used to produce some trees with genes that may confer resistance to the fungal disease," said Merkle, "and ultimately could be used to help restore the tree to our Eastern forests."

JOSEPH O'BRIEN / BUGWOOD.ORG

The American chestnut used to grow from New England down the East Coast, abundantly through the Appalachians. It was a valuable resource for the U.S., Merkle explained, as it was a fast-growing tree that was used in construction, leather-making and as a dependable nut crop. But in the 1880s, people began to import Asian chestnuts to plant in their yards and with these trees came the fungus that attacked the American trees.

The first documented instance of what became a widespread blight was in what is now the Bronx Zoo. A forester noticed the American chestnuts planted along the streets were dying. By 1904, the fungus had been identified as *Endothia parasitica* (eventually renamed *Cryphonectria parasitica*), but it was too late: The fungal disease spread rapidly, infecting Georgian trees by the 1940s.

"It happened amazingly fast," Merkle explained. "They were actually stunned at how fast it spread."

Merkle began researching the American chestnut blight in 1989, and has published several papers on the subject. In the past 20 years, he and his team of research associates and graduate students have been studying ways to get the chestnut trees to fight off the fungus. The disease works by attacking the chestnut after the bark has been injured, fanning out and killing the inner bark layer, eventually girdling the tree so that food and water cannot move up or down the stem.

So while the American chestnut used to grow more than a hundred feet tall, now they are usually no more than six feet tall before they are killed by the fungus, Merkle said. Most are just shrubs before they die, although larger surviving chestnuts have been found in isolated areas.

JOSEPH O'BRIEN / BUGWOOD.ORG

Chestnut blight attacks the trees after the bark has been injured and kills the inner bark layer.

Merkle hopes to change that. After years of research, he and Andrade devised a way to grow chestnut trees from single cells and then found an effective way to separate the genetically engineered cells from the cells that did not have the inserted genes. Now, they've used their system to insert an anti-fungal gene, obtained from collaborator William Powell at SUNY College of Environmental Science and Forestry, into chestnut trees that are being grown in a Warnell greenhouse in preparation for testing the ability of that inserted gene to fight off the fungus.

The way they'll do that, Merkle said, is by infecting the tree with the fungus and measuring how well it fights it off. It'll be at least two years before they can take that next step in the research, however, since the trees have to grow to a certain size before they can be screened.

"It's been a real challenge working with it," he said. "But the potential is there."

e NEWSLETTER
Get N.C. Wildlife Update—news including season dates, bag limits, legislative updates and more—delivered to your Inbox from the N.C. Wildlife Resources Commission. Sign up at www.ncwildlife.org/enews.

Commission and DOT Collaborate on Access

The N.C. Wildlife Resources Commission is collaborating with the N.C. Department of Transportation to establish and ensure continued recreational access to the state's public waters. The two agencies adopted a memorandum of agreement in September.

"Roadways and waterways intersect at bridges, and these points of intersection represent opportunities to ensure long-term and cost effective access to public trust resources," said Gordon Myers, executive director of the commission. "This agreement formalizes our longstanding partnership with NCDOT and creates a specific pathway to make full use of state lands located next to bridges and waterways."

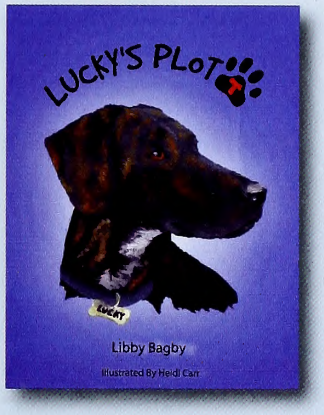
A memorandum of agreement between the commission and the NCDOT will allow the two agencies to more effectively work together to identify additional areas of potential recreational access to public waters along roadways, bridges and other infrastructure. Fishing and boating—along with public water access for those sports—are core to the commission's goals.

With close to 375,000 registered boats in North Carolina, boating is one of the most popular sports in the state. In addition, North Carolina has about 1.3 million anglers who spend more than $1.1 billion annually.

Lucky Reading

It's not often that a children's book combines realistic descriptions of hunting dogs in action with a tender tale suitable for the whole family, but "Lucky's Plott" is the rare story that achieves this balance.

Libby Bagby, a retired high school educator from Roaring Gap, tells the tale (based partly on actual events) of finding an injured Plott Hound alongside the road and nursing him back to health. Heidi Carr's simple yet detailed illustrations capture the excitement of the hunt, as well as the poignancy of the hound's recovery. The book even includes a glossary of terms used to describe hunting dogs.



In writing the story, Bagby used her real-life experience of rescuing a dog that she later discovered was a Plott Hound, the state dog of North Carolina. Lucky, as Bagby named the brindle-coated foundling, not only fully recovered but has joined Bagby in traveling all over the state giving presentations to hundreds of schoolchildren about the book and the history of Plott Hounds.

Kids will enjoy reading how Lucky and other Plotts track and chase a raccoon, only to lose the slippery critter in a stream. Lucky is hit by a car while chasing the raccoon, but is found by a kindly man who takes the injured dog for treatment and eventually brings him home to live happily ever after with a crew of other dogs.

"Lucky's Plott" is recommended for children who are dog lovers or simply fans of a good tale. To order the book and to find out more about Lucky and Libby Bagby, visit www.luckysplott.com.

–Greg Jenkins

NOAA Finds Fish Heading North

About half of 36 fish stocks in the Northwest Atlantic Ocean, many of them commercially valuable species, have been shifting northward over the last four decades, with some stocks nearly disappearing from U.S. waters as they move farther offshore, according to a new study by NOAA researchers.

Their findings, published in the journal *Marine Ecology Progress Series,* show the impact of changing coastal and ocean temperatures on fisheries from Cape Hatteras to the Canadian border.

Janet Nye, a postdoctoral researcher at NOAA's Northeast Fisheries Science Center laboratory in Woods Hole, Mass. and the lead author of the study, looked at annual spring survey data from 1968 to 2007 for stocks ranging from Atlantic cod and haddock to yellowtail and winter flounders, spiny dogfish, Atlantic herring and less well-known species like blackbelly rosefish. Historic ocean temperature records and long-term processes like the Atlantic Multidecadal Oscillation and the North Atlantic Oscillation dating back to 1850 were also analyzed to put the temperature data into context.

"During the last 40 years, many familiar species have been shifting to the north where ocean waters are cooler, or staying in the same general area but moving into deeper waters than where they traditionally have been found," Nye said. "They all seem to be adapting to changing temperatures and finding places where their chances of survival as a population are greater."

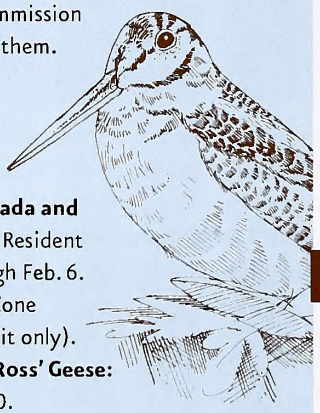
Ten of the 36 stocks examined had significant range expansion, while 12 had significant range contraction. Changes in a species range can be affected by both temperature changes and fishing pressure, with heavily fished stocks appearing more sensitive to climate change and often showing a larger shift. Seventeen of the 36 stocks occupied increasingly greater depths, and three stocks occupied increasingly shallower waters. However, the temperature at which each stock was found did not change over time, suggesting that fish are moving to remain within their preferred temperature range.

Fish species can respond to changes in ocean temperature in a variety of ways. The stock can move poleward to avoid warmer water temperatures, or move into deeper waters than they have previously been found. If fish cannot change their geographic or depth distribution, there may be changes in growth, reproduction and mortality rates. As a result, the size of the population may increase or decrease depending on the temperature preference of the species. Most species in the study responded to warming ocean temperatures in one of these ways.

IN SEASON

This month, these seasons are open in North Carolina:

Black Bear: See *Regulations Digest* for seasons and locations.
Bobcat: Through Feb. 28.
Common Snipe: Through Feb. 27.
Crow: Through Feb. 28.
Fox: See *Regulations Digest* for seasons and locations.
Grouse: Through Feb. 28.
Hatchery Supported Trout Waters: Through Feb. 28.
Mourning Dove: Through Jan. 15.
Pheasant: Through Feb. 1.
Quail: Through Feb. 28.
Rabbit: Through Feb. 28.
Raccoon and Opossum: Through Feb. 28.
Squirrel: Gray and red through Feb. 13.
White-tailed Deer:
Eastern: Gun through Jan. 1.
Central: Gun through Jan. 1.
Wild Boar: Through Feb. 28 only in Cherokee, Clay, Graham, Jackson, Macon and Swain counties. In the other 94 counties of the state, feral hogs are not considered to be wild boars, and the commission does not regulate them.
Woodcock: Jan.1–Jan.30.
Migratory Waterfowl
Dark Geese (Canada and white-fronted): Resident Population through Feb. 6. Northeast Hunt Zone Jan. 23–30 (permit only).
Snow, Blue and Ross' Geese: Through March 10.
Brant: Through Jan. 30.
Tundra Swan: Through Jan. 30 (permit only).
Ducks, Coots and Mergansers: Through Jan. 30.
Sea Ducks: Through Jan. 30 in Special Sea Duck Area.



There is no closed season or bag limit for groundhog, coyote, striped skunk and nutria. There is an open season for taking beaver with firearms during any other open season for the taking of wild animals.

Check the *2009–2010 North Carolina Inland Fishing, Hunting and Trapping Regulations Digest* for bag limits and applicable maps or visit www.ncwildlife.org.

Commission Schedules Public Hearings

The N.C. Wildlife Resources Commission has scheduled a series of nine public hearings to discuss proposed changes in the hunting and fishing regulations for the 2010–2011 seasons.

Most of the hunting and trapping proposals this year deal with game lands, including three proposals that would prohibit the use of hunting deer with dogs on Embro, Brinkleyville and Brunswick County game lands. Another proposal would increase the either-sex deer season on Jordan Game Land from the moderate season to the maximum season. There are no proposals that would affect deer hunting across the state or across a district.

Perhaps the most significant change in regulations for hunters would be the opening of red and gray squirrel seasons on the Monday on or nearest Oct. 15 and ending the season the last day of February.

The commission also proposes to allow armadillos to be hunted all year and trapped during the regular furbearer trapping season with no limits. Armadillos are not yet common in North Carolina, but the mammals have begun moving into our state from South Carolina.

The Division of Inland Fisheries has 27 proposals relating to trout fishing, most of which change the designation of streams. Among those reclassifications are two on the South Toe River that will change the headwaters section from Wild Trout to Catch-and-Release/Artificial Flies Only. The current Catch-and-Release/Artificial Flies Only section of the river would change to Wild Trout Waters.

2010 PUBLIC HEARING SCHEDULE FOR HUNTING, TRAPPING AND FISHING

ALL HEARINGS BEGIN AT 7 P.M.

DATE	DISTRICT	CITY	LOCATION
Jan. 4 (Mon.)	4	Dublin	Bladen Community College
Jan. 6 (Wed.)	5	Graham	Graham Middle School
Jan. 7 (Thurs.)	6	Norwood	South Stanly High School
Jan. 12 (Tues.)	8	Morganton	Municipal Auditorium
Jan. 13 (Wed.)	9	Sylva	Southwestern Community College
Jan. 14 (Thurs.)	7	Mount Airy	Mount Airy High School
Jan. 19 (Tues.)	1	Edenton	Swain Auditorium
Jan. 20 (Wed.)	2	New Bern	Craven County Courthouse
Jan. 21 (Thurs.)	3	Rocky Mount	Nash Community College

CALENDAR OF EVENTS

Saturday, January 9

Learn about wintering waterfowl at Pea Island National Wildlife Refuge with staff from the Outer Banks Center for Wildlife Education. Tour meets at Pea Island Visitors Center. Call (252) 453-0221, extension 3.
Visit www.ncwildlife.org.

Friday–Sunday, January 8–10

Check out the latest rods, reels, lures and other fishing gear at the Bass and Saltwater Expo at the State Fairgrounds in Raleigh. Event also includes boat dealers and seminars with professional fishermen.
Visit www.ncboatshows.com.

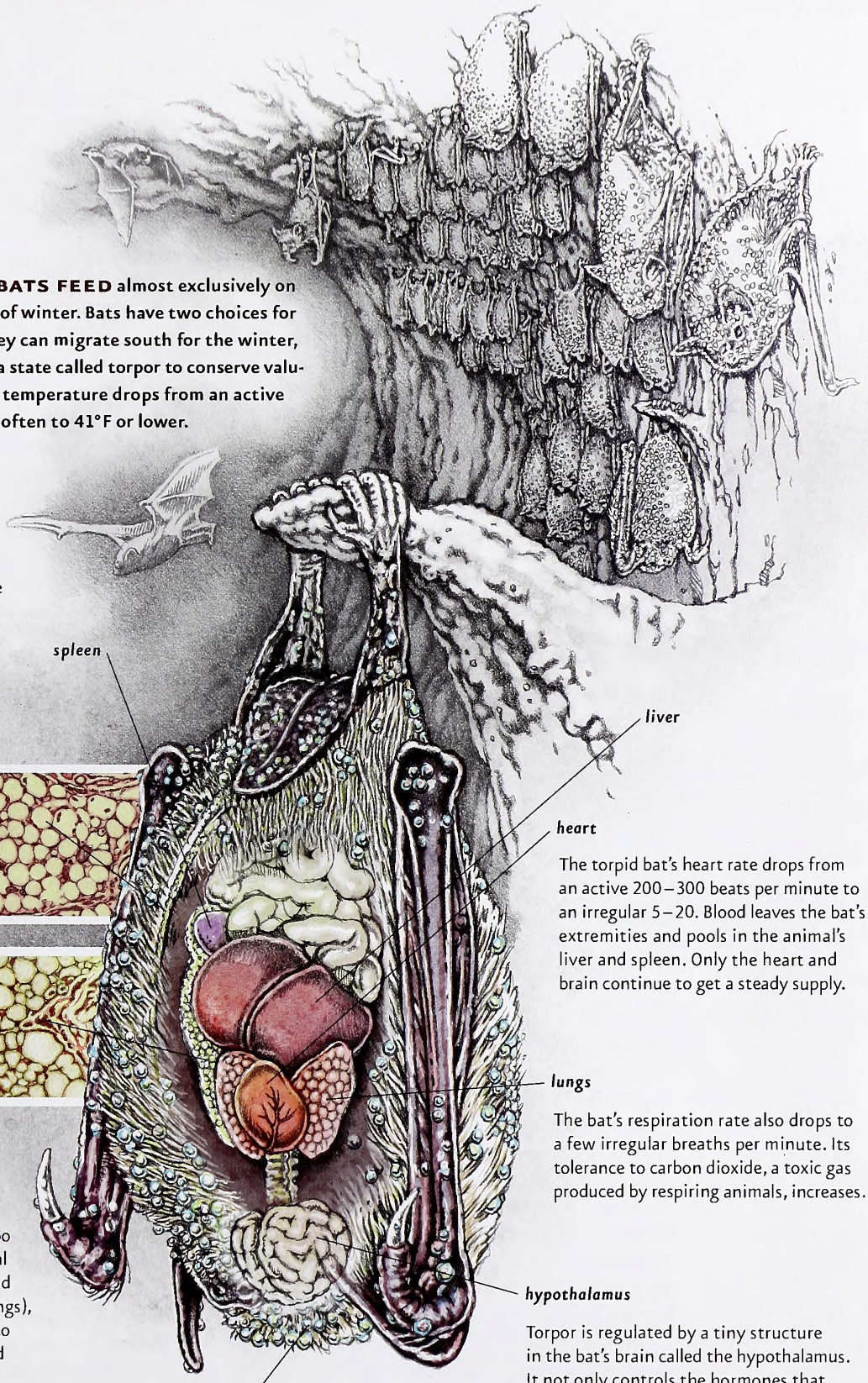
Thursday–Friday, Jan. 14–15

Learn about changes to the North Carolina coast at the Sea Level Rise Science Forum, presented by the N.C. Department of Environment and Natural Resources and the N.C. Division of Coastal Management. The forum, held at the Hilton North Raleigh, will feature distinguished speakers from North Carolina as well as invited speakers from other states. Registration is free, but limited.
Visit www.nccoastalmanagement.net/slr.html.

Readers should check with the contact listed before traveling to an event. Items for listing should be conservation-oriented and should be submitted at least four months in advance to jim.wilson@ncwildlife.org, or call (919) 707-0177.

What Happens to Bats in Winter?

written by Clyde Sorenson
illustrated by Jim Brown



ALL OF NORTH CAROLINA'S BATS FEED almost exclusively on insects, which are rare in the depths of winter. Bats have two choices for dealing with the paucity of prey: They can migrate south for the winter, or hibernate. Hibernating bats enter a state called torpor to conserve valuable energy. In torpor, the bat's body temperature drops from an active 100°F to that of its surroundings — often to 41°F or lower.

The fuel the bat uses to get through the winter is fat. White fat, found under the skin, is the primary "gas tank." A special tissue called brown fat generates the energy to bring the bat out of torpor. A bat has only a few grams of fat to get it through the entire winter.

Torpid bats are not unconscious. They are aware of what is happening around them, and they will rouse if disturbed too much. While bats normally rouse several times over the course of the winter (and sometimes appear on mild winter evenings), excessive disturbance can cause them to squander their precious fat reserves and die of starvation before spring arrives.

heart

The torpid bat's heart rate drops from an active 200–300 beats per minute to an irregular 5–20. Blood leaves the bat's extremities and pools in the animal's liver and spleen. Only the heart and brain continue to get a steady supply.

lungs

The bat's respiration rate also drops to a few irregular breaths per minute. Its tolerance to carbon dioxide, a toxic gas produced by respiring animals, increases.

hypothalamus

Torpor is regulated by a tiny structure in the bat's brain called the hypothalamus. It not only controls the hormones that put the animal in to torpor, but also brings it out.

Ghost Cats

written by Jim Dean

This past fall, a photograph was widely circulated on the Internet that showed a cougar dragging a deer. The claim was made that the photo was taken in western North Carolina, and it fired up so much interest that the N.C. Wildlife Resources Commission conducted an investigation.

MASLOWSKI WILDLIFE PRODUCTIONS

The photo, it turns out, was taken by a trail camera in Texas. The fact that this proved to be a hoax—and there have been others—does little to diminish the widespread public belief that these big cats still exist here and elsewhere in the East.

By whatever name they are called—cougars, mountain lions, panthers, painters, pumas, catamounts—there have been many reported sightings in the East since the 1960s. In 1975, after park service employees in the Great Smoky Mountains National Park told of seeing a cougar near Cataloochee, numbers of reported sightings ballooned. At one point, the N.C. Museum of Natural Sciences had recorded nearly 500 reports from all across the state, many clearly fabricated, but some from seemingly reliable sources. A significant percentage of those who reported they had seen a cougar also swore that it was solid black, rather than tawny brown. The rash of reports extended from Canada down the East Coast through the South.

"No taxonomic evidence has ever been found to positively identify a native Eastern cougar, and it likely is truly extinct."

Indeed, there was so much interest that the Eastern cougar *(Puma concolor couguar)* was added to the list of protected species under the Endangered Species Act in 1973, and extensive research on the status of cougars in the East was conducted by prominent wildlife biologists, including Robert Downing at Clemson University and Rainier Brock in New Brunswick. In addition, Chris Belden was studying the only other cougar species native to the East, a small remnant population of Florida panthers *(Puma concolor coyri)*.

Reported sightings are still fairly common, yet years of determined efforts have failed to produce hard evidence indicating that cougars are roaming wild in the East. Either the evidence has been inconclusive or easily linked to animals that had previously been in captivity. In North Carolina, two cougars shot at a garbage dump in Tyrrell County had tattoos proving they had previously been in captivity.

Even so, many folks believe cougars are still out there, while others argue that it's highly unlikely. Indeed, it may depend upon which cougar we're talking about. Here's what we know.

Originally, there were thought to be as many as 11 subspecies of cougars native to North America, but only two—the Eastern cougar and the Florida panther—were ever native east of the Mississippi River. Florida panthers are barely hanging on (only a handful survive), and Belden ruled out any possibility that they could have spread beyond their isolated range.

The Eastern cougar historically populated much of the East, but it was hunted mercilessly and has been considered extinct for well over a century. White-tailed deer—its favorite prey—were also hunted to near extirpation in much of the East before management helped restore their population in recent decades. However, no taxonomic evidence has ever been found to positively identify a native Eastern cougar, and it likely is truly extinct.

Does that mean all these reported sightings are misidentifications or hoaxes? Not likely. Many western and South American subspecies of cougars are kept in captivity, and even private citizens own them. Some cougars have escaped, while others have been released (a grown cougar is no puddy tat). Those Tyrrell County cougars are good examples, and there have undoubtedly been others. Nor are escaped or released cougars likely to be reported.

That raises the question of whether enough cougars have gained freedom to establish a breeding population. Experts doubt this, but that doesn't rule out the eventual possibility. And it certainly doesn't mean some folks couldn't have spotted at least a random formerly captive cougar, especially a wide-ranging male.

This may explain some reported sightings even if the original native Eastern cougar is extinct. It also raises the question of why non-native cougars in the East are still on the federal endangered species list. That issue might need reconsideration, and this should also give pause to any future attempts to reintroduce non-native cougars anywhere in the East.

Finally, how do we resolve the mystery of the black panther sightings? Are they all fabricated? No melanistic (black) color phase in cougars has ever been reported in this hemisphere. Some leopard populations in Africa and Asia are the only large melanistic cats, although the jaguar in South America occasionally appears in a darker spotted phase. If someone has honestly reported seeing a black cougar, it's likely the animal was wet, glimpsed briefly at dusk or dawn, backlit against the light, or all of the above.

Or—just maybe—it's an Asian or African leopard that outgrew its cage, or learned how to pick locks.

PETE MILLER

Fighting bluebirds

OUTDOOR MOMENT

IN THE FEBRUARY ISSUE

MELISSA McGAW/NCWRC

I'M WITH THE BAND
The practice of bird banding can tell us a lot about avian life spans, travels and family bonds.

FIENDS OF THE FOREST
Have killer beasts roamed North Carolina for centuries, or do we just love a good scary story?

BLENDING IN
Animals' success at camouflaging themselves can mean the difference between life and death.

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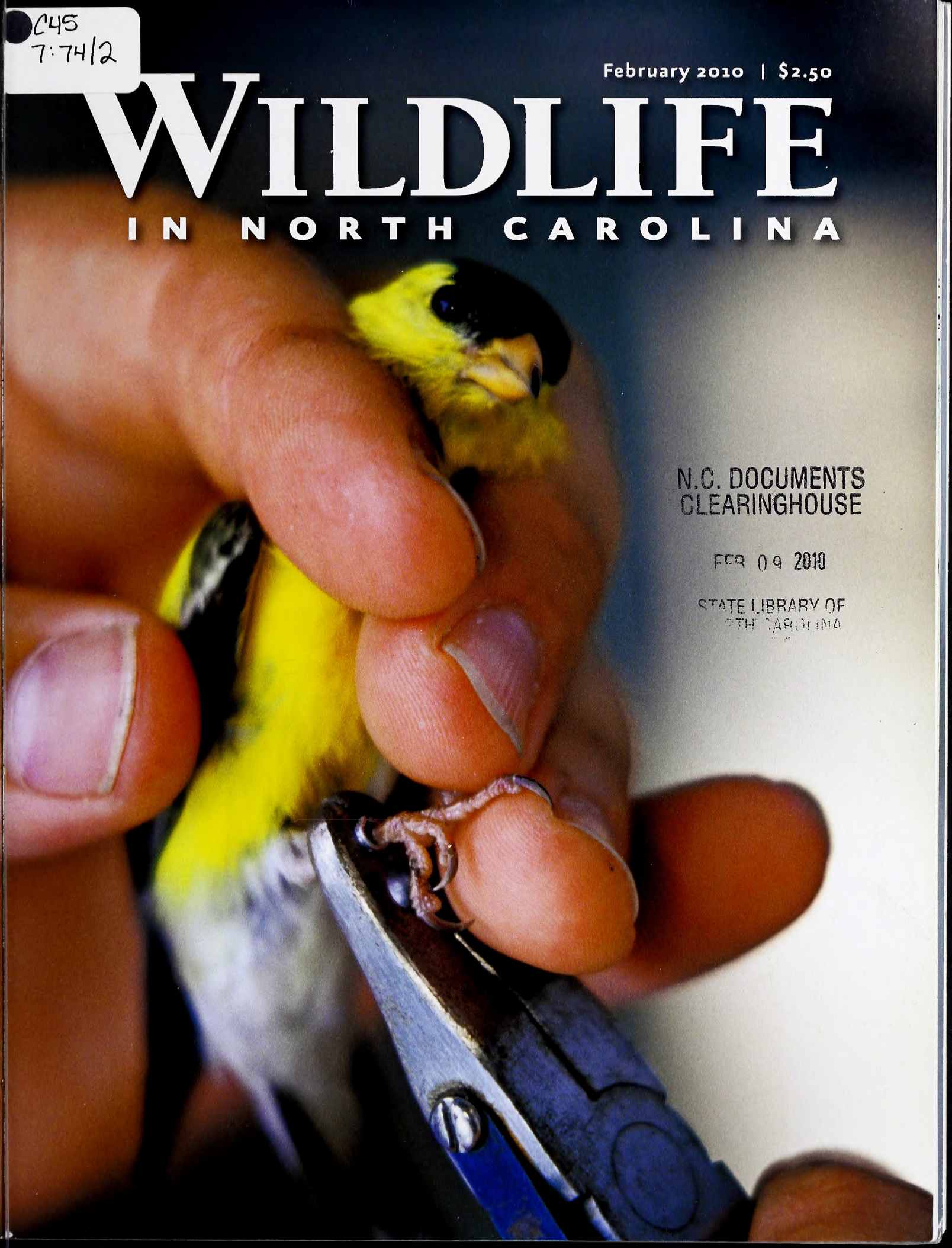
WILDLIFE IN NORTH CAROLINA



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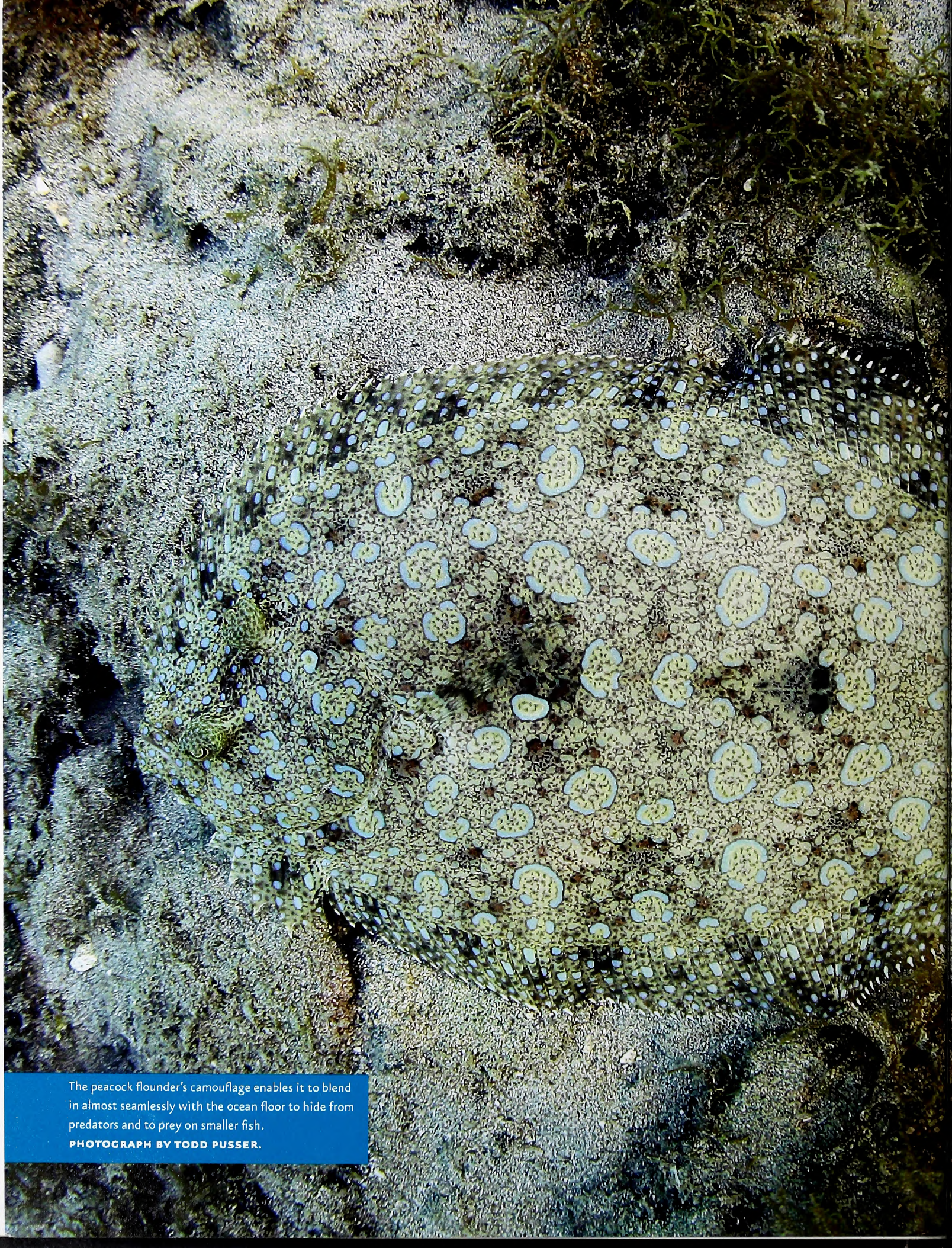

The peacock flounder's camouflage enables it to blend in almost seamlessly with the ocean floor to hide from predators and to prey on smaller fish.
PHOTOGRAPH BY TODD PUSSER.

Volume 74 | Number 2

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Cover: Through banding programs, scientists have been able to study the migrations and life cycles of songbirds such as the American goldfinch. PHOTOGRAPH BY TODD PUSSER.

Wildlife in North Carolina is the official educational publication of the North Carolina Wildlife Resources Commission. It is dedicated to the sound conservation of North Carolina's wildlife and other interrelated natural resources and also to the environment we share with them.

EDITOR'S NOTE

It has taken me most of my life to learn how to dress for winter weather. When I was a kid—back when it used to snow in North Carolina—I recall being wet and chilled to the bone after just an hour of playing outside in the frozen stuff. We had to abandon the sled run and the snow fort to go inside so the feeling would return to our toes and fingers. Once that was accomplished and our bellies were full of hot cocoa, there was the requisite changing of clothes and mostly fruitless attempts to dry our boots quickly.

DAVE DYET

Except for the occasional wool sweater or socks, which are effective against the chill, I played outside in blue jeans and sweatshirts topped off with a winter coat. Cotton clothing is useless against the wind and absorbs water like a sponge. Back then, if you weren't lucky enough to own a pair of ski bibs, the shortcomings of your clothes were eventually going to curtail your snow-day fun.

Around that same time, my dad was wearing business suits made of polyester double knit. Fortunately for men's fashion and protection against the cold, polyester fell out of favor as a material for dress clothes and was reinvented as fleece. Not long after that, some textile genius figured out how to make fleece windproof. To my cold-natured self, windproof fleece is better than sliced bread.

With the addition of a waterproof fabric such as Gore-Tex, it was finally possible to stay outside during winter for hours on end and remain toasty and dry in all types of weather. Suddenly, activities such as winter fishing ("Break the Ice with White Bass," page 16) and duck hunting didn't sound so crazy to people who like to stay warm. Hunters, skiers, hikers and other outdoor enthusiasts could be active without bulky clothing, and the inexpensive price of fleece meant that parents could wrap their little snow bunnies in warm polyester all winter.

When the mercury is low and it's time to go outside, I dress in fleece from head to toe (don't forget the windproof gloves and hat). Now that I'm properly attired, the cold doesn't bother me like it used to. If you like the sound of this but can't stand to discard the traditional gear of the winter outdoors, put on your polyester first and then pull on that old Woolrich plaid jacket. Enjoy the outdoors this winter.

Greg Jenkins

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WILDLIFE IN NORTH CAROLINA

FEBRUARY 2010 VOLUME 74, NUMBER 2

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Medium Well, Please

Folks, I've been a fan of your magazine for a long time. Must say that the article by Shari Smith in the Dec. 2009 issue ("Harmless Lies, Poetry and Cheeseburgers All The Way") struck deep emotions on small towns, great characters, solid friend/family values and tradition. You can take it to the bank that I'll be having a cheeseburger in the Claremont Café soon. Kudos.

Randy Evans
Morganton

Best issue yet! I hardly knew where to start. Well, we all know I started with Shari Smith. With photos, too. Now I know she's not making these men up.

As for the rest of the issue, I don't get out into the wilds, don't hunt or fish, don't even have a holly bush, but those pieces had things to tickle me, too. I can relate well to "cold as a Donald Rumsfeld hug," for instance ("Surviving Carolina"), and I wear shoes more often than I used to, also ("Stuck on Hollies"). From my letters in the past, you may have noticed I really appreciate when words are put together well. For me, that's the best reason to have a subscription to *WINC*!

Blue Breese
Kure Beach

Minimal Entertainment Value

I am very disappointed in *Wildlife in North Carolina*. I have been a subscriber for quite a while now and I can't understand why recently it seems your magazine is focusing more and more on hunting and fishing. Should we not be concerned about conservation and learning ways to save what we have left in our beautiful state? I see in the December issue a beautiful picture of a tundra swan and turn the page to see some hunter smiling with this swan corpse. Next article: lots of good ol' boys telling tales of hunting in Claremont Café. The article about the holly impressed me. That's all I get.

Not everybody that reads your magazine are hunters or fishermen. Can you please throw us a bone every now and then and give us more articles of conservation?

Anna Sanford
Hamlet

I object to T. Edward Nickens' injection of politics into his "Surviving Carolina" article where he says "on a night as cold as a Donald Rumsfeld hug." Did he think this was cute? Funny? Clever? It was not. Why not substitute "Pelosi?" Or behave as a professional editor and omit it entirely.

Judi Gustafson
Forest City

***Greg Jenkins:** The magazine's content is quite often seasonal. That means we generally publish articles during the month in which their topics occur. WINC is published by the N.C. Wildlife Resources Commission, which manages wildlife and regulates hunting and inland fishing in the state. During the fall, we run a lot of hunting stories because hunting seasons are occurring all across the state. A quick look through a year's worth of issues will show that we publish articles on natural history and conservation topics throughout the year. As for politicizing the magazine, sometimes a joke is just a joke.*

Kind Words

I've enjoyed your publication for a very long time and never more than of late. I am grateful for your many writers' voices for appreciation of intimacy with all manner of outside engagements. Thank you so very much for this valuable and encouraging work.

As a tree, shrubbery and garden farmer and a manager of a stewardship forest, I am up to my ears in treefrogs, coyotes, deer, turkeys, quail, butterfly weed and alternatives to scorched-earth landscaping. Any voices which help us get off the porch are a boon.

Ron Vinson
Bakersville

I was not aware of your magazine until I saw it at the doctor's office and was blown away by the photographs. I look at those first in each issue. I held onto the annual photo competition issue for several months. You should make them available as posters, note cards, etc.

I also want to comment on the excellent quality of your writing in your articles. Explanations of complicated processes are succinct and very understandable. The length of most articles is just right.

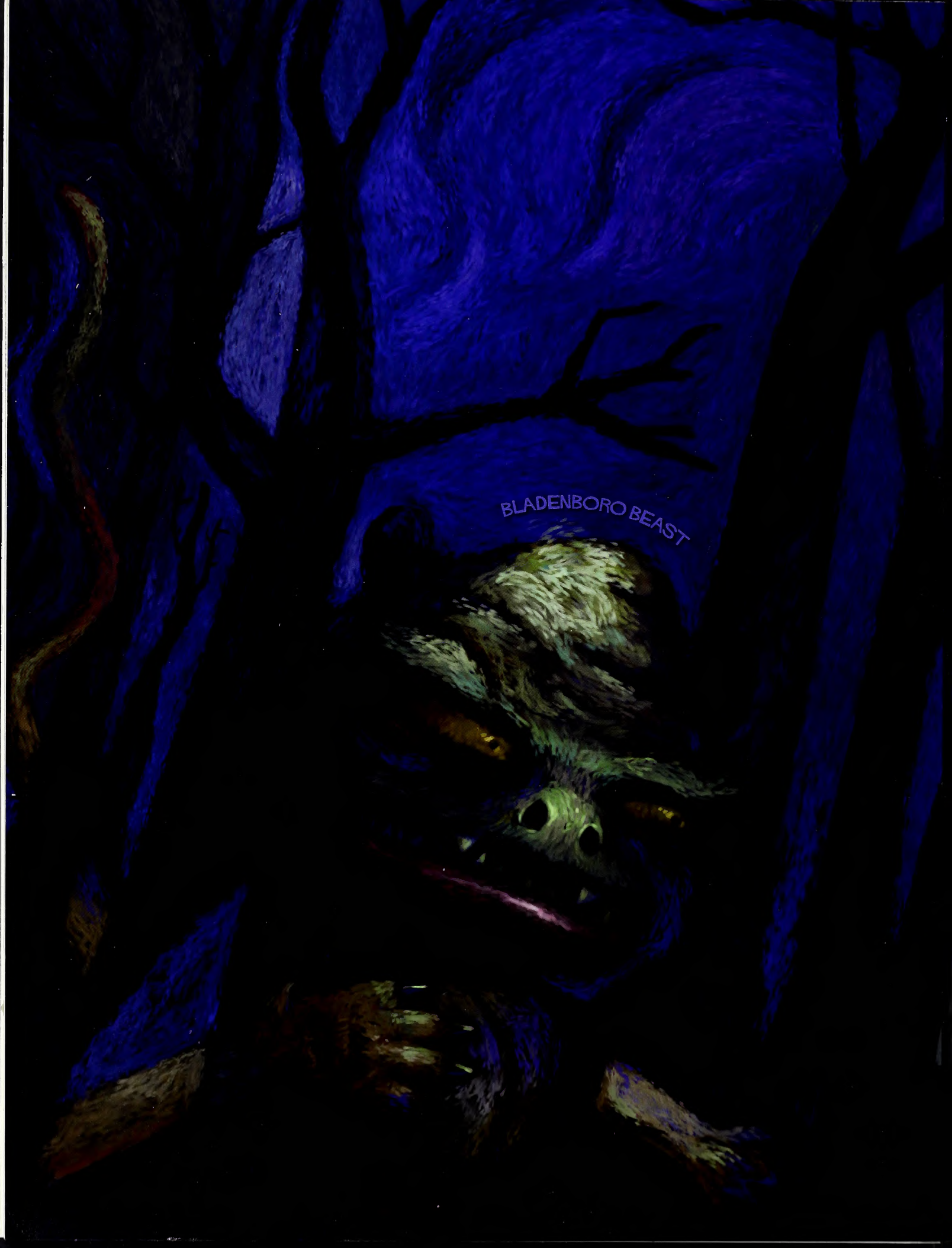
I don't hunt or fish, but I'm interested in wildlife since I see so much of it. I live close to Winston-Salem and I see lots of animals on my property. I would be interested in articles about attracting/deterring wildlife, wildlife adapting to urban spread, and identification of paw/hoof prints. I have had a number of interesting encounters with wildlife: a poisonous caterpillar that sent a roofer to the emergency room, a possum that got into the crawl space and froze (thawing out was wonderful), squirrels teasing and attacking my cat, and an albino deer in a pasture for two hours, causing a traffic problem as cars stopped to watch.

I enjoy your magazine very much, and it is a wonderful value. Keep up the good work.

Nancy Farnham
Walkertown

write us

Letters should be sent via e-mail to **letters@ncwildlife.org** *or through regular mail to Letters,* Wildlife in North Carolina *magazine, 1712 Mail Service Center, Raleigh, NC 27699-1712. Please include your name, address and daytime phone number. Letters chosen for publication may be edited for clarity and length.*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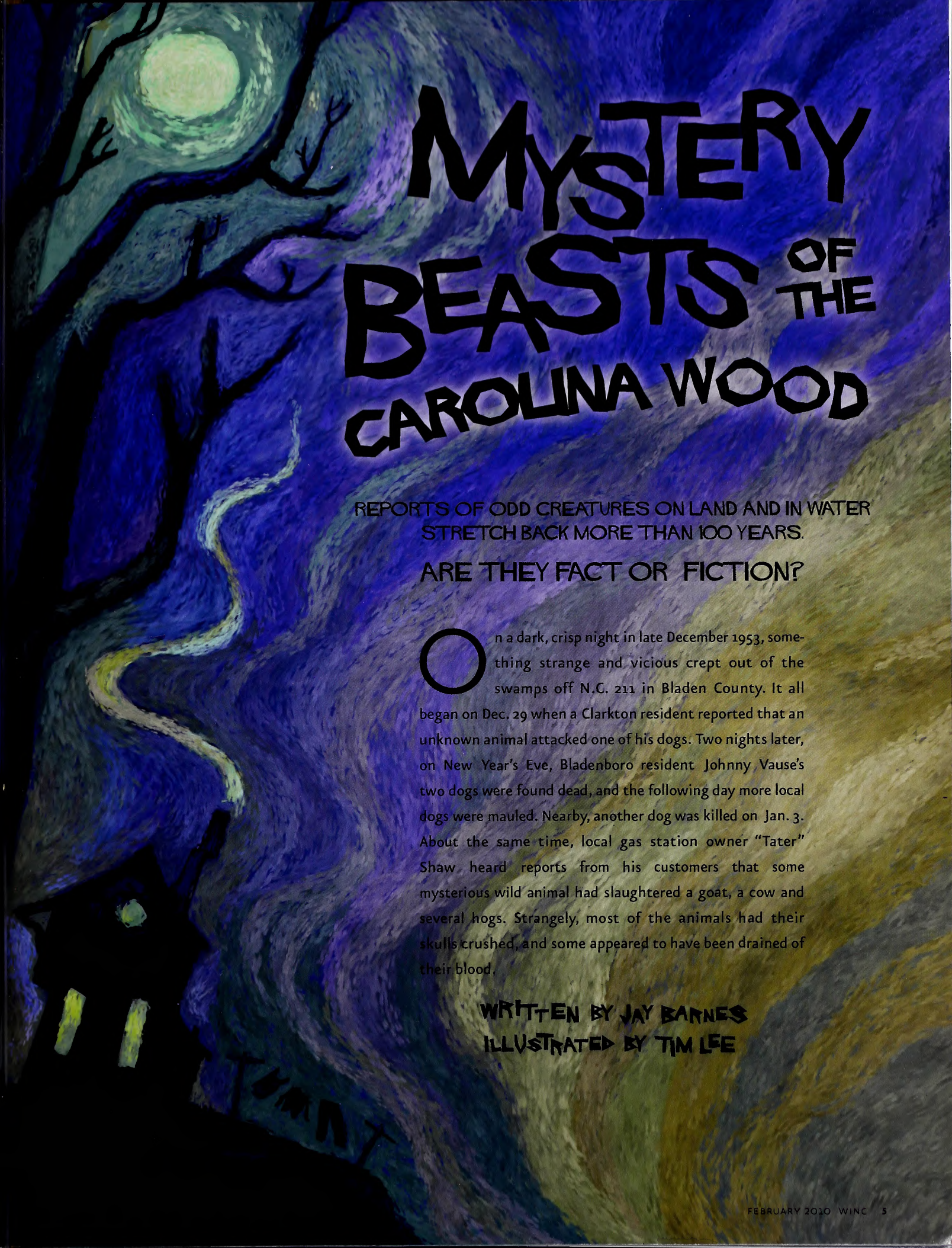


MYSTERY BEASTS OF THE CAROLINA WOOD

REPORTS OF ODD CREATURES ON LAND AND IN WATER STRETCH BACK MORE THAN 100 YEARS. ARE THEY FACT OR FICTION?

On a dark, crisp night in late December 1953, something strange and vicious crept out of the swamps off N.C. 211 in Bladen County. It all began on Dec. 29 when a Clarkton resident reported that an unknown animal attacked one of his dogs. Two nights later, on New Year's Eve, Bladenboro resident Johnny Vause's two dogs were found dead, and the following day more local dogs were mauled. Nearby, another dog was killed on Jan. 3. About the same time, local gas station owner "Tater" Shaw heard reports from his customers that some mysterious wild animal had slaughtered a goat, a cow and several hogs. Strangely, most of the animals had their skulls crushed, and some appeared to have been drained of their blood.

WRITTEN BY JAY BARNES
ILLUSTRATED BY TIM LEE

By Jan. 4, 1954, Bladenboro police chief Roy Fores had his hands full investigating multiple attacks around the town. He took his coonhounds out to track the creature but later said his dogs "refused to follow the trail." Mayor W. G. Fussell reported the incidents to the Wilmington *Star-News*, which sent a reporter out to investigate. It was then the *Star-News*' Jan. 5 cover story that stoked fear and panic throughout the Bladenboro area:

"Vampire Tendencies Found in Bladenboro's Monster

"This nervous town chewed its collective nails today, dreading the pitch of night that might bring a return visit by a mystery killer-beast with vampire lust... [Fores] said "a dog found killed last night was opened up today. And there wasn't more than two or three drops of blood in him." In all three cases, the victims' bottom lip had been broken open and his jawbone smashed back."

Indeed, the Beast of Bladenboro, as the newspaper called it, forced area residents to round up their children and pets, lock their doors and load their firearms. The attacks continued, and rumors swirled out of control. Fear of the mystery animal gripped the small community.

On Jan. 6, a 21-year-old mother had a front-porch encounter with the creature, which she described as "about 4 feet long with a round face." Large catlike tracks were found nearby. Over the next week more dogs were killed. A few eyewitnesses came forward to describe the beast, but their descriptions conflicted—some said it was large and brown like a bear, others said it was about 100 pounds, with a long tail and "runty looking ears." From a distance its eerie midnight wail sounded "like a woman crying." A state veterinarian surmised it was probably not a bobcat or cougar, but more than likely a coyote.

Media stories about the mystery beast spread nationwide. Chief Fores was soon overwhelmed with calls from hunters offering to track down the creature. Sportsmen began arriving from upstate and from faraway places such as Tennessee, Texas and Arizona. Within days, the streets of Bladenboro were jammed with truckloads of hunters, dogs and guns. So many hunters poured into the nearby swamps that Fores feared someone would be mistakenly shot. Whatever the creature was, it seemed likely this mob would either kill it or chase it away.

CRYPTIDS AND CREEPS

The Beast of Bladenboro is just one of many mysterious animals that have allegedly roamed the boggy swamps and backwoods of the Tar Heel State. Collectively, they are studied by a special breed of researchers known as cryptozoologists, and the creatures themselves are known as cryptids (hidden animals). Now, you won't find cryptozoology listed as a core science at your local university. Instead, these folks exercise their own intriguing blend of folklore, anecdotal evidence and scientific method (think "MonsterQuest" on The History Channel). The Loch Ness Monster and Bigfoot (along with cousins Sasquatch and Yeti) are perhaps the most well known cryptids, but there are literally hundreds of other mystery creatures, including many found right here in the good ol' South.

Before you completely discount the cryptozoologists and their work as wholesale urban legend, take note of some past species whose discoveries made headlines. Local legends and anecdotal reports were not widely accepted for these until live specimens were uncovered: giant panda (1869), okapi, a short-necked relative of the giraffe (1901), mountain gorilla (1902), Komodo dragon (1912), megamouth shark (1976) and giant gecko (1984).

Cryptozoologists are especially proud of the 1938 discovery of the coelacanth off the coast of South Africa. Previously, the fish was known only by fossil records from the Cretaceous period, and from the fervent claims of local fishermen who said they'd seen it.

Most cryptid stories begin that way, from fleeting glimpses, grainy photographs or nondescript footprints in the mud. Witnesses often refuse to accept the mundane explanations they're offered by skeptical authorities. Black panther or neighbor's cat? Bigfoot or standing bear? Many witnesses never report their more bizarre sightings for fear of ridicule. But now, thanks to the Internet, there's a forum where strange beasts of all kinds may flourish.

One quick Google search will deliver a wealth of cryptozoology Web sites that offer a menagerie of the unexplained. Some cryptids are reported so frequently they have become instant legends. Among them are giant octopuses, living dinosaurs, desert-dwelling subterranean worms, giant-winged Thunderbirds and a host of sea serpents such as British Columbia's Ogopogo and Lake Champlain's Champ (both reported to be Nessielike creatures). There's also El Chupacabra, the "goatsucker" that terrorized the Puerto Rican countryside in the 1990s and then somehow migrated to Mexico.

Closer to home, we have the infamous winged Mothman that frightened the people of Mount Pleasant, W. Va., in 1966-67; Virginia Devil Monkeys, kangaroo-like apes that supposedly have killed livestock and attacked moving cars in central Virginia; South Georgia's Altamaha-ha, a 20-foot-long porpoiselike beast that has reportedly rammed small boats in the Altamaha River; and the charming 7-foot-tall scaly-skinned Lizard Man of Lee County, S.C., who gained notoriety when he was seen by several witnesses in Scape Ore Swamp in June 1988.

BOATERS, FISHERMEN AND EVEN ENTIRE SCHOOL GROUPS HAVE LOGGED IN REPORTS OF SOMETHING STRANGE SWIMMING ABOUT THE LAKE.

In North Carolina, the Beast of Bladenboro has plenty of company on the cryptid list. There's an intriguing story about a large "sea serpent" that was struck and injured by the Grace Lines steamer *Santa Clara* on Dec. 30, 1947, as the ship passed some 120 miles off Cape Lookout. And near Charlotte, it turns out we may have our own Nessielike phenomenon in Lake Norman. Mooresville resident Matt Myers created LakeNormanMonster.com as the official Web site for the mysterious beast called Normie. Boaters, fishermen and even entire school groups have logged in reports of something strange swimming about the lake. Biologists say it could be an oversized catfish or alligator gar, but others think it's something much larger. And of course, the Web site offers souvenir Normie hats and T-shirts.

CAT CRAZE

Among the most common mystery animal sightings are those of big cats. Though cryptozoologists and biologists still debate the presence of Eastern cougars in North Carolina, alleged sightings over the years also include those of black panthers, African lions, long-tailed bobcats and even a reddish spotted cat some call the Cherokee Cheetah. The presence of any large cats here may seem dubious, but numerous accounts have been collected from all corners of the state—from the swamplands of Brunswick, Bladen, Columbus, Pender, Onslow and Hyde counties to the high ridges of the Appalachian Trail.

One of the more interesting is that of the Santer cat that reportedly terrorized Iredell and Wilkes County residents more than a century ago. The Aug. 28, 1890, edition of the *Statesville Landmark* carried the first story about the cat, followed by a more detailed description in the Salisbury weekly *Carolina Watchman* on Sept. 11: "The brute is described as having abnormal capacity for food, and has a weakness for pigs, cow, sheep, and . . . children." The

THE BRUTE IS DESCRIBED AS HAVING ABNORMAL CAPACITY FOR FOOD, AND HAS A WEAKNESS FOR PIGS, COW, SHEEP, AND . . . CHILDREN.

Watchman featured additional details on Oct. 9, in which witnesses claimed it was "not quite as large as a cow" and had heavy chains around its neck. It clawed at the door of a family near Second Creek and was then chased away by gunshots.

Santer reports in the *Landmark* and the *Watchman* waned after 1893 but then returned in 1896. From May through October 1897, the *Watchman* ran multiple stories about the mystery creature, one describing it as a large dog, another quoting a witness as saying "it was striped from the end of its nose to the end of its tail." It was also called the cat-eater because of its preference for devouring house cats. More attacks were reported through 1899, after which the Santer presumably disappeared. One last Santer sighting was described in the *Landmark* on May 28, 1934.

During the 1890s, cougars were still known to the region. A February 1893 column in the *Wilkesboro Chronicle* reported a large catamount (cougar) trapped near Summit, "the 14th ever seen in this section in 25 years." So was the Santer a cougar? Perhaps. But the newspapers offered another theory. Small traveling circuses were common during this era, and occasionally lions, tigers and leopards were thought to have escaped from their cages. It is quite possible that the Santer cat was a former sideshow attraction.

Other intriguing reports of large cats have made news, including that of an African lion killed by deer hunters in northern Georgia in the mid-1960s, and the fabled Vienna Beast that supposedly chased cars near Winston-Salem in the 1950s. A skull found in a ditch near Rutherfordton in the 1980s was apparently analyzed by the Smithsonian and determined to be that of a young African lion. And emergency notification messages were broadcast to students and faculty at Clemson University in South Carolina in December 2007 after several security officers spotted a large, dark-colored "panther" over a period of three weeks. Wildlife authorities are quick to surmise that these and other large felid sightings are either cases of mistaken identity or glimpses of escaped or abandoned exotic pets.

Though mountain lion populations have rebounded remarkably in the West, confirmed Eastern cougar sightings east of the Mississippi are rare. Mark McCullough, endangered species biologist with the U.S. Fish and Wildlife Service, says that since 1900, only 65 cougar sightings have been confirmed in the Eastern United States outside Georgia and Florida. The most recent confirmation in North Carolina occurred in the mid-1990s when a young cougar was trapped alive in Rutherford County. In a recent and ongoing study along 600 miles of the Appalachian Trail, hundreds of motion-sensitive cameras have snapped thousands of images of bears, deer and other creatures, but so far no cougars. Moreover, there may be more than 1,000 cougars held as pets in the East, so it's always possible that some sightings are escapees.

SOLVING THE MYSTERIES

Occasionally, wildlife biologists can successfully identify mystery creatures, especially if good photographic evidence is available. This was the case with the Tyco Animal, an odd-looking hairless visitor seen in the woods around Tyco Electronics in Fuquay-Varina in 2006. Employees speculated it might be an Australian dingo, a Mexican hairless-whippet crossbreed or the legendary Wampus Cat of Appalachian folklore (that supposedly walked on its hind legs). Creatures matching its description had been spotted around Randolph and Guilford counties a few years before. In May 2004, Asheboro businessman Bill

Kurdian snapped a photo of one feeding on corn in his backyard. After Tyco employees captured video of their mystery creature, state wildlife officials were able to confirm its identity: the Tyco Animal was a Sampson's fox. The Sampson's is a rare red fox that lacks an outer layer of fur (guard hair) due to a genetic abnormality. Mystery solved.

But not every cryptid is so easily revealed. More than 50 years after the mystery creature stalked the back yards of Bladenboro, no one is any closer to closing the case. Was the beast a cougar, coyote, wild dog or bear? And what about the Beast of Bolivia, a similar large animal that killed several dogs—including two pit bulls—in Brunswick County in 2007?

After two weeks of chaos, Bladenboro police chief Fores called off the search on Jan. 13, 1954, after an oversized bobcat was killed and brought into town. Mayor Fussell, fearing that the mob of hunters might hurt someone, hoisted the bobcat on a flagpole near Tater Shaw's store with a sign that read: "This is the Beast of Bladenboro." But was the bobcat really the beast?

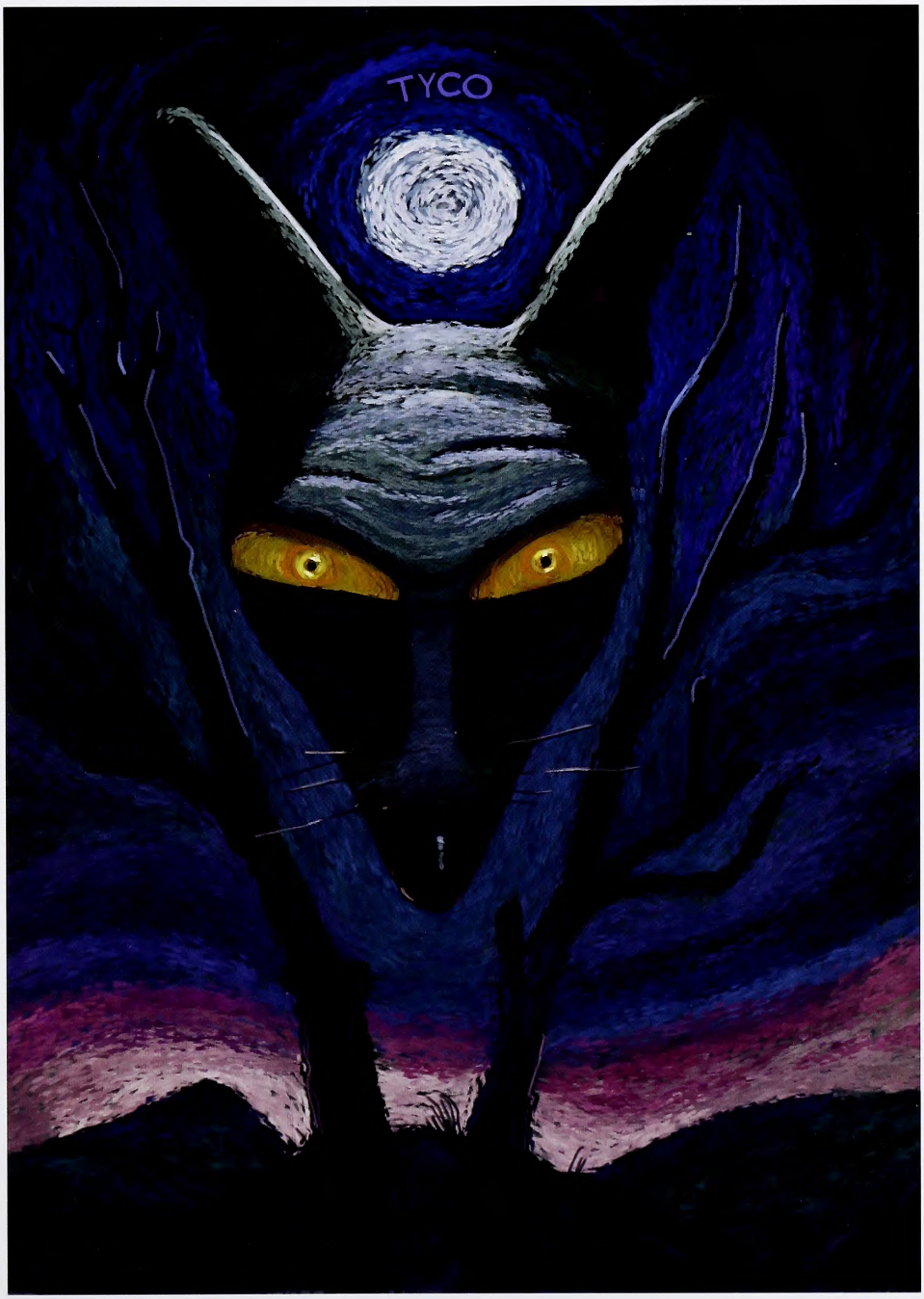
Around this same time, a motorist found a dead ocelot—a small wildcat native to Mexico—off N.C. 41 near Big Swamp. This, too, seemed to solve the mystery. According to newspaper reports, the ocelot likely escaped from a traveling zoo that caught fire in Myrtle Beach in 1951. But within a few days, a local hog was found partially eaten and a goat died when its face was "chewed off."

Some believe the Beast of Bladenboro was actually a combination of hoax and hype, perhaps generated by Mayor Fussell himself. It seems the mayor owned the local movie theater, which at the time happened to feature the 1949 film "The Big Cat." After all, once the first newspaper reports surfaced, Fussell distributed flyers that read: "Now you can see the Cat. We've got him on our screen! And in Technicolor too!"

Mysterious animal encounters, whether real or imagined, make great campfire stories. We all share a deep-seated instinct to avoid being eaten, and an ancient fascination with what might dwell in the woods. But to solve the mysteries of unknown animals, wildlife scientists need hard evidence—like a body to examine.

"Stories are not evidence," says McCullough. "They may be good stories, but they're still just stories."

. . . A LOCAL HOG WAS FOUND PARTIALLY EATEN AND A GOAT DIED WHEN ITS FACE WAS CHEWED OFF.



Jay Barnes is the former director of the N.C. Aquarium at Pine Knoll Shores and the author of "North Carolina's Hurricane History."

Biologists can learn much from a tiny piece of aluminum fastened to a bird's leg.

TODD PLESSER

Circle *of* Life

THE LONGSTANDING PRACTICE OF ***banding birds*** PROVIDES INVALUABLE INFORMATION ON THE ***life history*** AND ***migratory*** HABITS OF A WIDE RANGE OF SPECIES. ***Written by Eric G. Bolen***

John James Audubon pondered the brood of Eastern phoebes in a nest at a shallow cave in eastern Pennsylvania. It was 1804, and Thomas Jefferson was sending his Corps of Discovery westward in part to describe the natural resources of the Louisiana Purchase. Audubon, just 19, likewise was discovering nature's wonders in America. The strapping youth had left France the year before to oversee property owned by his father near Philadelphia. Audubon was still years away from publishing his remarkable paintings of North American birds, but his keen interest in the lives of birds was already in motion.

The small phoebes in the nest were just days away from fledging, and Audubon had a thought. Would the nestlings return as adults to the same area where they were reared? To answer the question, he tied—loosely, to prevent injury and to allow for growth—a "silver wire" around the leg of each nestling in hope of finding some of the same birds the following year. At the time, the winter quarters of phoebes, like most other migratory birds, lay somewhere yet unknown to the south. To his delight, Audubon located two of the now-grown phoebes a year later in the same locale where he had marked them the previous nesting season. With his loops of silver wire, John James Audubon became the pioneer of bird banding in North America.

In Europe, others had attached bands of one kind or another for centuries, but it's unclear if Audubon knew of those efforts when he banded the young phoebes. Some of the early markings likely were for no other purpose than to establish ownership, as when Henry IV, King of France, placed bands on falcons he used for hunting. In 1595, one of his falcons escaped and showed up 24 hours later on Malta, an island about 1,350 miles away in the Mediterranean Sea. The wayward bird's flight averaged 56 miles an hour. In 1669, another royal figure, Duke Ferdinand, banded a heron that his grandson recovered in 1728, thereby indicating the birds could live at least 60 years. Little changed until 1890 or so, when a Danish ornithologist,

1804
John James Audubon begins banding birds

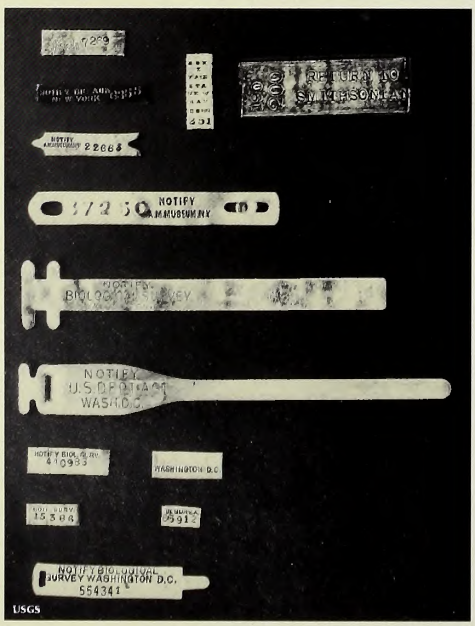
Paul Bartsch adds serial numbers to bands
1902

1909
Formation of the American Bird Banding Association

Migratory Bird Treaty
1916

1920
Frederick C. Lincoln organizes the federal bird banding program

Frederick Lincoln (below) is considered the originator of the modern banding program and the father of the flyway concept for waterfowl in North America.



Hans Christian C. Mortensen, attached zinc rings—he later switched to aluminum, still used for most bird bands—bearing the name of the banding site and the year to the legs of European starlings.

Back in North America, Paul Bartsch earned the honor as the first person to undertake a truly scientific approach to bird banding when, in 1902, he banded black-crowned night herons in the District of Columbia. The bands were etched with a serial number, the year and "Return to Smithsonian Institution." His efforts continued sporadically until 1910 and yielded recoveries from as far away as Canada and Cuba. Meanwhile, Jack Miner began banding large numbers of ducks and geese at a private waterfowl sanctuary he established near Kingsville, Ontario. Miner's bands bore his address and, often, a short verse of scripture such as "God is able," but they were not numbered. Because of the scriptures, Inuit and other native peoples in northern Canada often brought the bands to missionaries for interpretation. The first of his banded ducks was recovered in South Carolina in 1910, and in 1915, the first of some 20,000 geese he banded between 1909 and 1939 was recovered in northern Ontario.

Such activities led to the formation of the American Bird Banding Association in 1909, but the growing data lacked coordination and standardization, and in 1920 banding became the jurisdiction of the Bureau of Biological Survey (predecessor of the U.S. Fish and Wildlife Service) and the Canadian Wildlife Service. Because of the Migratory Bird Treaty (1916) and the Migratory Bird Treaty Act (1918), the federal government gained jurisdiction over the management, including banding, of migratory birds. (Except for endangered species, nonmigrant birds are banded under state authority.)

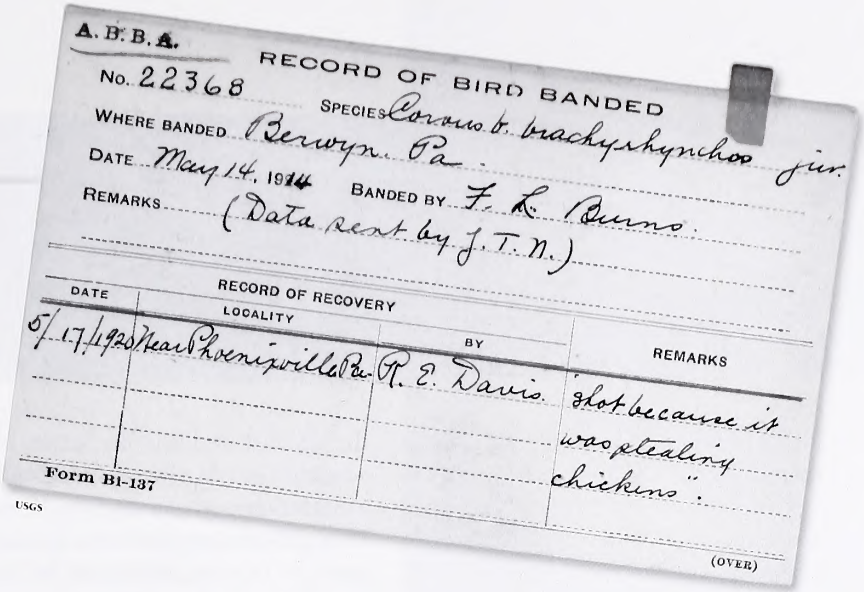
In 1920, Frederick C. Lincoln assumed responsibilities for organizing the federal bird banding program, which he directed until 1946. The task was daunting, but he nonetheless designed a uniform system for handling the growing mountain of banding data in an era predating computers. He wrote nearly 250 publications, including descriptions of traps to catch birds for banding, and most concerned what had been learned from the banding program. In 1935, he published two landmarks, "The Waterfowl Flyways of North America" and "The Migration of North American Birds," the latter expanded into book length in 1939. Lincoln is honored as the originator of the modern banding program and as the father of the flyway concept for waterfowl in North America.

ABOUT BANDS

Federal permits and bands are issued by the Bird Banding Laboratory housed at Patuxent Wildlife Research Center in Laurel, Md., which is also the depository and clearinghouse for all banding data and activities, including those in Canada. To date, more than 58 million birds have been banded, of which some 3.5 million were later recovered.

In addition to a serial number, each band once carried the notation "Avise Bird Band, Washington, D.C., USA." The Spanish "avise" is close enough to its English counterpart, advise, to be useful in all of the languages used in North and South America. Remarkably, this simple direction and brief address produced responses mailed from even the remotest locations in far-off lands. In 1995, the message was changed to "Call 1-800-327 BAND" and "Write Bird Band, Laurel, MD 20708 USA." Many years ago, a misprint on one lot of bands transposed the "i" and "o" in the abbreviation for Biological,

1935
Publication of
The Waterfowl Flyways of North America and
The Migration of North American Birds


A. B. B. A.
RECORD OF BIRD BANDED
No. 22368 Species Corvus b. brachyrhynchos jur.
WHERE BANDED Berwyn, Pa.
DATE May 14, 1914 BANDED BY F. L. Burns.
REMARKS (Data sent by J. T. N.)
RECORD OF RECOVERY
DATE | LOCALITY | BY | REMARKS
5-17-1920 | Near Phoenixville Pa. | R. E. Davis | Shot because it was stealing chickens.
Form B1-137
USGS
(OVER)

and the resulting address on the band thus read "Avise Boil. Surv., Wash." Hence, the story goes that at least one respondent indignantly challenged the "advice to wash, boil and serve." The bird, he claimed, was the toughest he'd ever eaten!

Bands are available in 23 standard sizes, along with five special sizes, that fit the full range of birds—hummers to swans. Butt-end bands are used on most birds, but birds with strong bills like hawks and owls require lock-on bands, and those placed on eagles are attached with rivets. In some cases, bands made of stainless steel, Monel or other hard metals are used on birds that outlive the durability of aluminum or on birds that live in harsh environments. At times, a bird carrying an aluminum band may survive long enough that the serial number erodes, leaving no more than an apparently smooth surface. With chemical treatment, however, biologists usually can determine enough digits to identify the original number.

MELISSA McGAW/NCWRC

F. EUGENE HESTER

Data gleaned from banding helps biologists in setting seasons for waterfowl in North America's four flyways.

WHAT DO WE LEARN FROM BANDING BIRDS?

All birds are not recovered in equal proportion to the number banded. As might be expected, migratory game birds head the list of recoveries. In a given year, about half of the banded swans are recovered, 30 percent of the banded geese, and up to 20 percent of the ducks, trailed by woodcocks (10 percent) and doves (4 percent). In contrast, no more than 1 percent of banded songbirds are recovered. Of some 131,000 vireos and warblers banded, for example, only 89 were recovered by 2001. Information derived from band recoveries thus is more robust for some species than others. Nonetheless, much has been learned over the years. Banding information provides

MELISSA McGAW/NCWRC

BANDS ARE AVAILABLE IN 23 STANDARD SIZES, ALONG WITH FIVE SPECIAL SIZES, THAT FIT THE FULL RANGE OF BIRDS—***hummers to swans.***

USGS

insight into the basic biology of birds as well as guidance for their management.

Migratory movements, in both time and space, are the most obvious type of information gleaned from band recoveries. Based on thousands of banded birds, especially waterfowl, Frederick C. Lincoln described four major flyways crossing North America on a north-south axis: Atlantic, Mississippi, Central and Pacific. The flyways resemble immense funnels, widest in the North where they overlap, then progressively narrower southward. Because of the overlap, birds of the same species may travel in either one of two or more flyways, but these nonetheless represent discrete subpopulations whose migratory traditions persist for generations.

Pintails and other ducks nesting in the Prairie Pothole region, for example, may end up in the Central, Mississippi or Atlantic Flyway, but they typically maintain their migratory faithfulness to just one of these year after year. In Utah, ducks nesting in the marshes on the eastern edge of Great Salt Lake move in either the Central or Pacific Flyway, and some of the redhead ducks nesting there also move eastward to the Atlantic Flyway. Tundra swans wintering in North Carolina follow a primary migratory route that begins in Alaska, thus crossing all four flyways as they traverse North America.

The flyways revealed by band recoveries are biological pathways that evolved over hundreds of millennia and understandably do not always coincide with the geopolitical boundaries of the modern world. Thus North Carolina lies fully within the Atlantic Flyway, but Louisiana overwinters birds from both the Mississippi and Central flyways and, as already mentioned, Utah is a crossroads for redhead ducks migrating in three flyways.

Nonetheless, the biological flyways provided a useful administrative template for managing most migratory birds, and in 1948, the U.S. Fish and Wildlife Service formally adopted Lincoln's flyways as administrative units for managing waterfowl. Paramount among these activities is the annual promulgation of hunting regulations for waterfowl that are tailored to conditions peculiar to each unit. Accordingly, if drought in one flyway precludes good nesting success, bag limits and season lengths within that flyway can be more restrictive than in other units where production might be better because of normal precipitation.

SETTING SEASONS

Some flyways at times authorize special seasons or bag limits for waterfowl. The most notable of these is the special season for blue-winged teal. Because bluewings begin migrating southward by the end of August, well before the regular season begins, large numbers of the species escaped hunting pressure in most states. Bluewings in fact begin arriving on their primary wintering areas in Mexico, Central America and northern South America by September. (One bluewing banded in southern Canada in mid-August was killed in Colombia just 16 days later.) In response, a September teal season of up to nine days in length was inaugurated experimentally in the Mississippi and Central flyways in 1965 and later became a regular feature. Diminished waterfowl populations led to a temporary halt of the special season in 1988, but it was reinstated in 1998 in the Atlantic Flyway and thereafter in both the Mississippi and Central flyways.

In general, the teal season lasts for 16 days in September and permits a daily bag limit of four birds, which may include cinnamon and green-winged teal as well. Similarly, a lightly harvested mallard population in the Central Flyway prompted biologists to initiate a High Plains Mallard Management Unit in 1968 that permits a special 23-day season for the exclusive harvest of male mallards. As with all season and bag limits for waterfowl, each state within a flyway may opt for stricter regulations than those otherwise authorized for each flyway (e.g., a shorter, but not longer, season length). In sum, banding revealed the somewhat fuzzy biological boundaries for the areas traversed by migrating birds that biologists thereafter hardened into useful administrative units.

Banding likewise helps determine some of the fundamental aspects in the life history of birds. Audubon's simple experiment with phoebes, for example, determined that the young of this species return to breed in the same area in subsequent nesting seasons—a phenomenon now known as homing behavior or philopatry. Modern-day banding has determined that this pattern varies by species. In most ducks, for example, the female exhibits strong philopatry, returning to the same marsh to nest year after year, whereas this attachment in males usually is much less developed. This information emphasizes the importance of protecting breeding areas to assure returning females the availability of suitable nesting habitat where they have previous experience. The sex-specific nature of philopatry in many species of ducks also means that females each year mate with a male from another area, thereby constantly mixing the gene pool and precluding the development of distinct races. Banding provides a measure of dispersal for birds banded at a given location.

Banding also reveals the tenure of pair bonds. If a pair of birds is banded while nesting and the same two birds are nesting together in following years, a lifelong pair bond is indicated, as is the case for geese and swans. A lifetime pair bond also means that both sexes, along with their offspring, return each spring to the same breeding area, leading to genetic isolation and distinctive

subspecies (e.g., dusky Canada goose). Also because of banding, we know that if a bird's mate should die, the survivor will find another mate and establish a new lifelong pair bond with that bird.

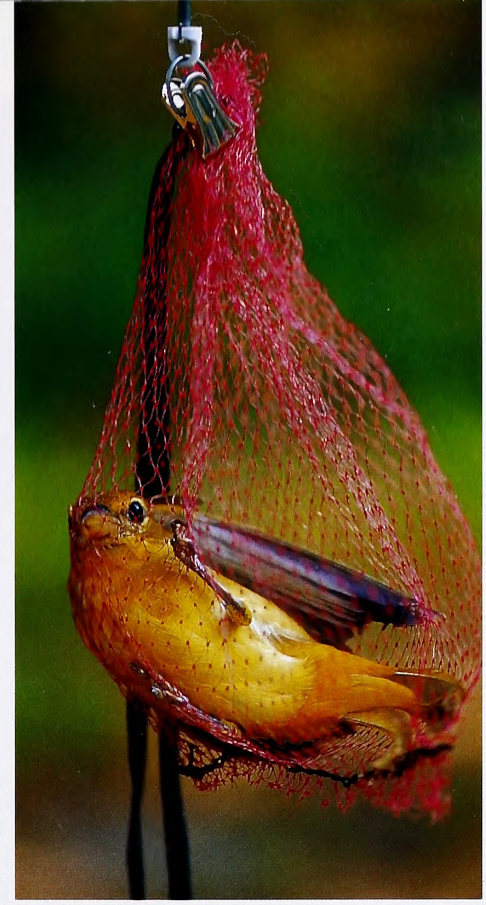
Banding determines life spans (recall Duke Ferdinand's well-aged heron). Records at the Bird Banding Laboratory include a 12-year-old hummingbird. The longevity record for our state bird, the Northern cardinal, is 15 years 9 months. Records for some other common species include: Canada goose, 24 years 4 months; wood duck, 22 years 6 months; and red-tailed hawk, 21 years 6 months. Additionally, biologists have learned much about the social structure of birds (e.g., pecking order and territorial behavior) by supplementing the numbered aluminum bands with color markers that improve visual identification of individuals.

Finally, banding provides the foundation for understanding the dynamics of bird populations. Recall that the first question typically asked by life insurance agents is "How old are you?" Similarly, biologists use banding records to determine the proportion of birds dying in their first year of life, second year and subsequent age classes. With enough band recoveries at hand, complex computer programs yield estimates of annual mortality rates, from both hunting and natural causes such as disease and predation.

This information, of course, is especially important for managing game birds. Of particular interest is whether hunting significantly increases natural mortality (a situation known as additive mortality) or replaces deaths from predation and other natural causes so that the overall loss of birds each year is essentially unchanged (compensatory mortality). Arguments continue, and some environmental conditions affecting survival may change yearly, but it now seems that hunting is compensatory in nature, at least until a point is reached where hunting increases the death rate and thus becomes additive. Hence, bag limits and season lengths ideally keep hunting mortality from becoming additive. Banding information also can measure the vulnerability of each sex and age class to hunting pressure. It likewise determines survival rates for bird populations that are exposed to oil spills or disease for comparisons with those that are not.

Thanks to banding, we know a great deal about ecology and population dynamics of birds. But the system works only when hunters and others who recover banded birds report the serial number, date and location to the Bird Banding Laboratory. This small effort melds hunters and scientists into a team dedicated to the sound management of migratory birds. Audubon, I'm sure, would be quite pleased. ⬘

Eric G. Bolen, formerly dean of the graduate school, is now professor emeritus at UNC Wilmington and contributes occasionally to Wildlife In North Carolina.



MELISSA McGAW/NCWRC

Biologists gather several pieces of information from captured birds prior to banding, including the bird's weight and wing measurements.

TODD PUSSER

MELISSA McGAW/NCWRC

MELISSA McGAW/NCWRC

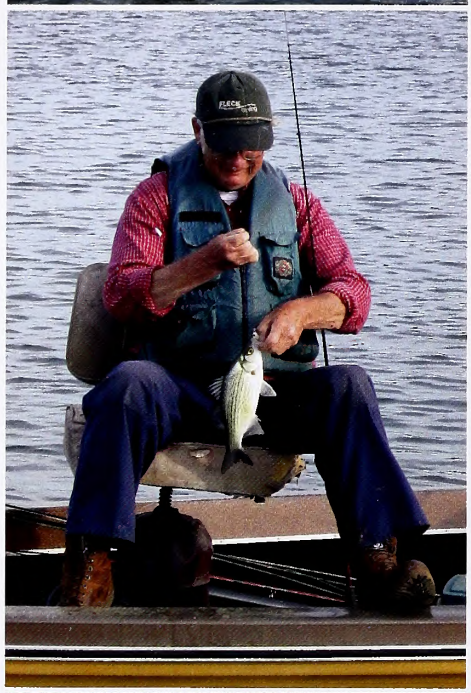
BREAK THE ICE WITH WHITE BASS

KICK OFF THE SEASON WITH A FISH THAT'S AGGRESSIVE, HARD-FIGHTING AND FLAT-OUT FUN TO CATCH.

When I pulled into the boat launch, I could see small whitecaps not far offshore, created by a cool, steady March wind. As I eased down to the ramp, Wayne Epley, my fishing partner, was standing on the end of the dock. He was looking at the surface of the lake.

Maybe there's too much wind, and it'll be too cool, I thought. *Maybe he won't want to fish . . .* Wayne turned and looked at me. "We'll have to fight the wind, but I believe we'll catch fish," he said. "What do you want me to do to help you launch?"

Written & photographed by Jeremy Grady



With a bit of knowledge about the spawning and schooling behavior of white bass, you can fill a cooler with them on a nice late-winter day.

We were going to brave the wind in pursuit of white bass. Determined to try, we would not let the weather deter us. Furthermore, it had been a couple of months since we caught any fish. I backed the boat down the ramp.

We headed out to a small bay area where a river fed the lake. The wind was cool and the small whitecaps remained steady, so I didn't floor the throttle. Wayne motioned for me to stop the boat so we could fish in the middle of the little bay. I had two spinning rods—one outfitted with a small Panther Martin, the other a small Shad Rap. Wayne started throwing his favorite lure for white bass, a 2-inch Lit'l Fishie. While I kept my foot on the trolling motor to prevent the wind from pushing us around, we began casting.

We fished for an hour or more without a bite, during which time the wind seemed to get cooler and the lake rougher. Thoughts of ending the trip early started to creep in. About that time I felt something stop my Shad Rap. The fish stayed down and dug deep while pulling drag. Based on the way this fish fought, I knew it was a white bass. The fish came reluctantly to the side of the boat. It was a deep-bodied, heavy white bass about 14 inches long. While I was unhooking the fish, Wayne said, "There's one!" I put my fish in the live well and netted his. The wind and waves didn't seem as bad now.

We motored around the bay while casting the small lures. The wind died down, and the sunshine felt good. Once the water was somewhat calmer, we could see where white bass were making small rings in the surface. Following the rings with the trolling motor, we continued to pick up fish.

SPECIAL TIME OF YEAR

Throughout most of the year, white bass roam lakes in pursuit of baitfish. But in mid-March, when daffodils and Bradford pear trees start blooming, they prepare to spawn. This begins a six-week period lasting through April. Every spring, anglers flock to the Roanoke River to fish for striped bass during their spawning migration. White bass are closely related cousins of the striper and act in a similar way. They'll move into tributaries to spawn, creating a similar fishing opportunity.

The first step is knowing where the fish are. If your lake is known to have a good white bass population, locate places where streams empty into the lake. White bass move up into these tributaries to spawn, but they'll roam the coves or bays that these streams empty into prior to moving into the stream. The biggest fish move in first, which are females that can average 2 to 3 pounds. As the season wears on, smaller fish move in, most of which are males. They'll travel in schools (sometimes large ones) and move around until some fish decide to move up into the stream. While they're roaming in these schools, an angler can catch large numbers of fish—sometimes three or four consecutively. If there are several anglers in the boat, you can fill up a cooler quickly.

Because you're fishing in early spring, you will probably have to deal with some windy conditions. I don't mind fishing while there's small chop on the water, but if there are larger waves that can toss my 18-foot bass boat around, I will stay home and wait for another day. Occasionally the wind can actually help an angler. After several hours of blowing into a bay, sometimes the water will get a little dingy. White bass tend to congregate in dingy water.

CIRCLES AND PARALLEL LINES

One March day, we fished for hours without a single bite in an area where one of the main rivers fed in. We had actually started heading to the boat launch when Wayne suggested trying a cove where a small creek emptied in. As we moved into the cove, I wasn't expecting a strike. So when something stopped my Panther Martin, it startled me. The fish fought hard, and by the time I boated it, Wayne was into a fish. We made a couple of large circles just random casting and ended up catching 25 white bass in two hours.

Once I get to the area to fish, I simply start casting. Many times I'm casting out in the middle of the cove or bay. With the trolling motor on a low speed, I'll maneuver the boat steadily, making almost parallel casts. The next cast is parallel to the last, with the exception of the distance the trolling motor has pulled the boat. I'll continue this while looking for any kind of surface disturbance. If the water is calm, white bass will sometimes let you know where they are by chasing minnows to the surface. Once I find fish, I then work the area back and forth because there are usually more.

Don't impart any action on the lures. Whereas their black bass cousins (largemouth, smallmouth, spotted) sometimes like erratic retrieves, my best luck with whites is slow and steady. If I'm throwing some sort of spinner, I'll retrieve it just fast enough to

feel the blade turning. Same thing for a crankbait—reel it just fast enough to feel it wiggling. You may catch more fish on a smaller lure, but I've caught numerous 2- to 3-pound white bass on the spinner. The crankbait may produce bigger fish on average. Another reason I like the crankbait is that it dives deeper. Sometimes it'll kick the bottom, which may help trigger a strike.

SMALL TOOLS FOR BIG BITES

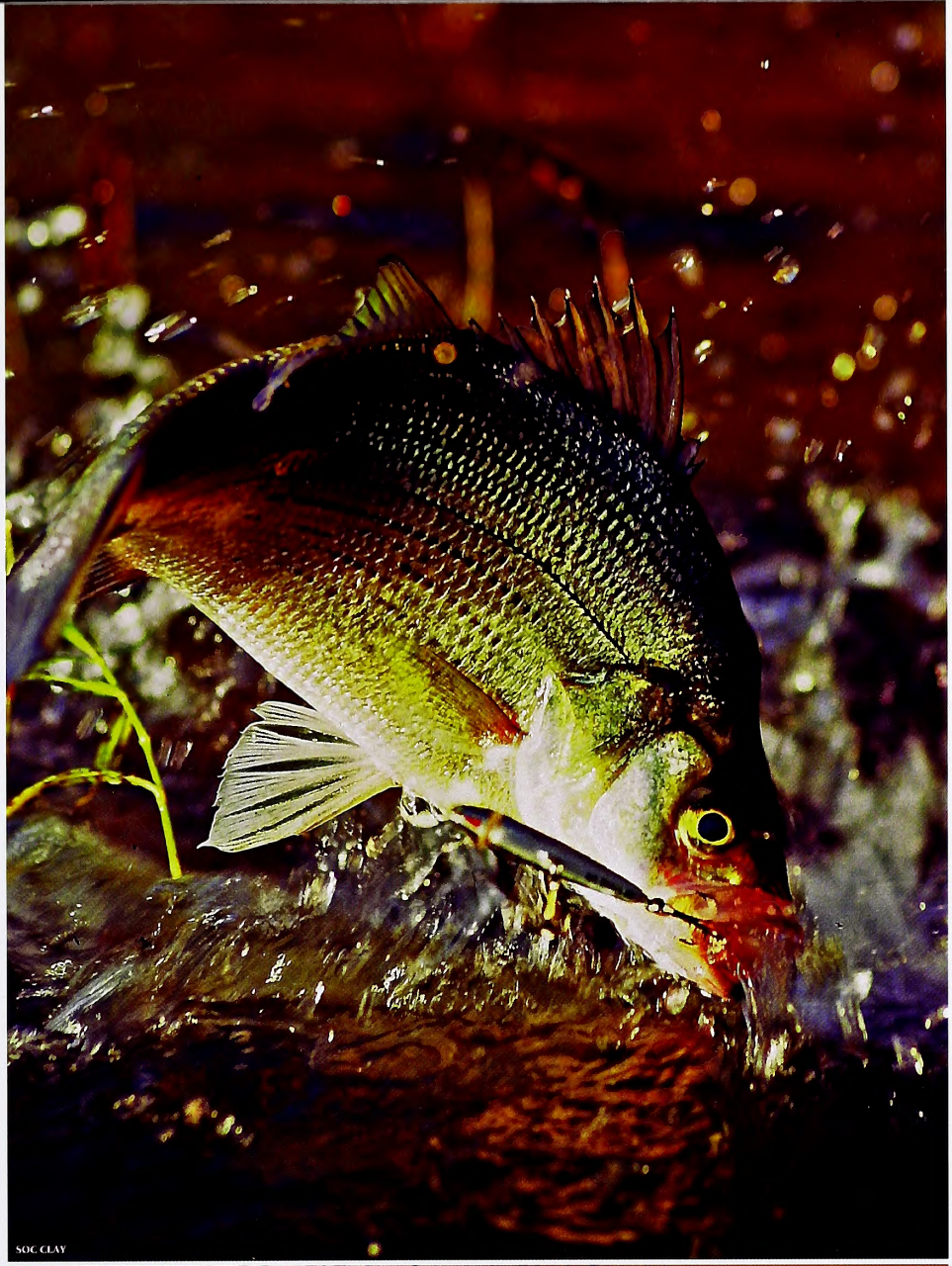
When choosing lures for white bass, you have to think small. They have smaller mouths than their black bass cousins, about the size of a crappie, but not as tender. Although they can be opportunistic feeders at times, mostly small shad or minnows make up their diet. Small inline spinners such as silver-bladed Panther Martins and Rooster Tails in ⅛ ounce to ¼ ounce are good choices. As for crankbaits, just about any 2-inch lure in shad color will do. A Size 5 Shad Rap shallow or deep runner will cover your crankbait option. A No. 7 or No. 9 Rapala will cover the minnow option. Marabou jigs, curly tail jigs and Road Runners in white or chartreuse have been staples for years. And Wayne's all-time favorite is a ⅛-ounce Lit'l Fishie.

I always keep a 5-weight fly rod ready with a No. 6 Clouser minnow on. I like the Clouser minnow because it sinks quickly, and the stripping motion gives a jigging action. Just cast the fly and strip it in with 1-foot pulls. I rarely see the fish take the fly—all I feel is the fish on the line. Sometimes we'll find fish with hardware and switch to a fly. A white bass of any size on a fly rod is a lot of fun. They put you in mind of fighting a really big bluegill.

Most of our white bass fishing is done with light spinning tackle. A 6-foot rod with a reel spooled with 6- or 8-pound test line will do fine. You need this lighter-action outfit to cast the smaller lures. Also, because you're using lighter line, make sure the drag is set correctly. White bass try to stay down when hooked, and they like to do short bursts, so a loose drag will prevent break-offs. Out of habit, I re-tie my lures on throughout the day.

Early white bass fishing is a lot of fun. The fish are good size, eager biters and relentless fighters. This is an excellent way to kick off the fishing season, especially after sitting around all winter. ◆

Jeremy Grady is a freelance writer from Morganton and an occasional contributor to Wildlife in North Carolina.



SOC CLAY

SOC CLAY

The Art of CAMOUFLAGE

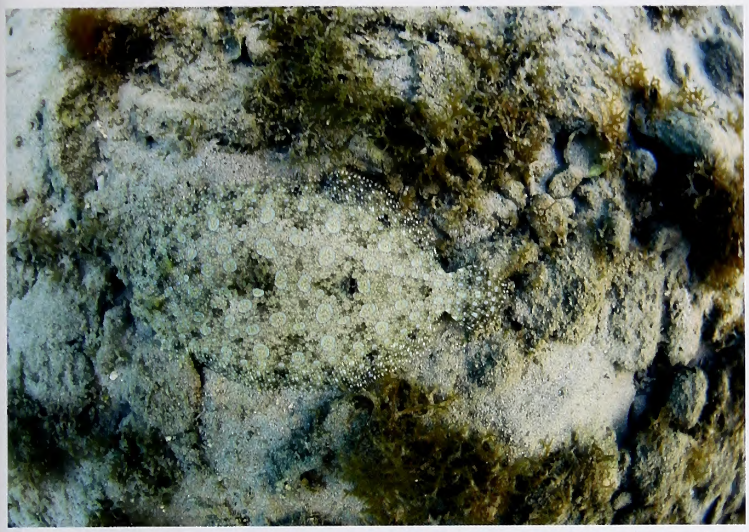
Survival in nature often depends on an animal's ability to hide in plain sight.

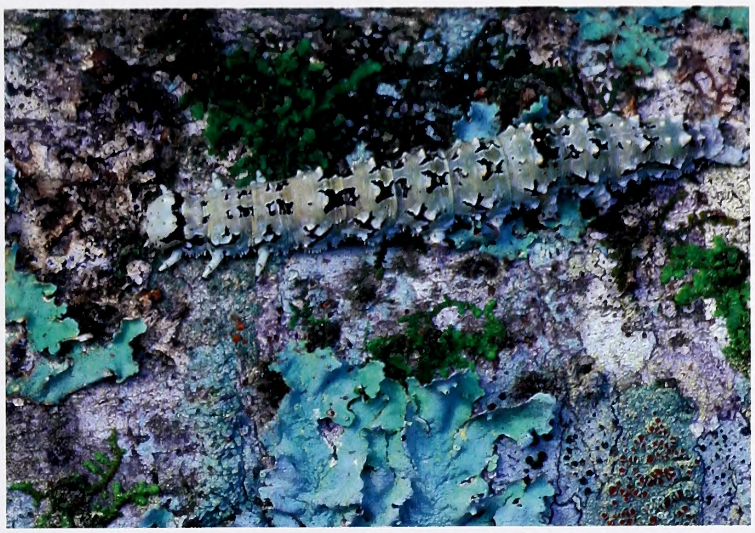
Written and photographed by Todd Pusser

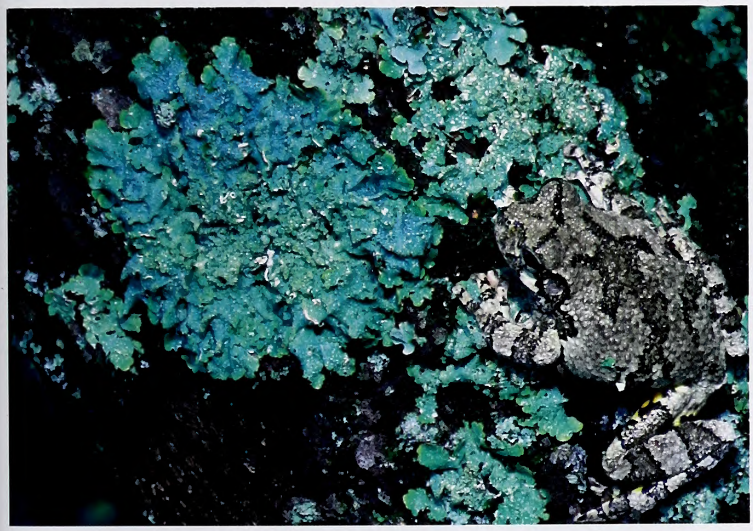
In the wilds of North Carolina, survival depends on being able to adapt to the environment. Nothing emphasizes that point more than the extremes animals go to blend in with their surroundings. The use of camouflage to fool predator or prey is a key component to surviving in the natural world. The ability to disappear in plain sight might mean the difference between life and death. The bodies of many North Carolina creatures are disguised by cryptic colors and disruptive shapes and angles that mimic the pattern of light and shade.

Look closely at the images in this collection. Nothing in nature is what it seems. The bark of an oak tree might actually be a screech owl soaking up rays in the mouth of a natural cavity. The lichen on a tree branch might hide the outline of a treefrog or caterpillar. The leaves on the forest floor disguise the deadly coil of a rattlesnake patiently waiting for a meal to pass by. Nature rewards those that can trick the eye of the beholder. Discovering these hidden creatures and photographing them in their natural environment required sharp eyes, patient observation and, above all else, a good deal of luck.

Todd Pusser is a marine biologist, a freelance writer and photographer living in Aberdeen, and a frequent contributor to Wildlife in North Carolina.







Top Left: A peacock flounder rests on the ocean floor. Its laterally compressed body and ability to change colors to match the surrounding sandy sediment allow the flounder to avoid detection by predators while also allowing it to act as a sit-and-wait predator that engulfs smaller fish that swim too close. Peacock flounders are typically found in warmer waters off the coast of Florida and in the Caribbean. Only larvae of this species have been found off the North Carolina coast. However, as ocean temperatures continue to rise, it is possible this beautiful and tasty species of fish will become a regularly occurring member of our state's fauna. Top right and lower left:The caterpillar of the ilia underwing moth and a Cope's gray treefrog are incredible lichen mimics. At rest, these animals can be detected only by careful scrutiny at close range. Lower right: A timber rattlesnake lies quietly coiled among leaves of a hardwood forest along Drowning Creek in Moore County. Highly venomous, its mottled pattern blends with the leaf litter and serves primarily to allow the snake to hunt small mammals as a sit-and-wait predator.

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Previous page: Eastern screech owls are masters of camouflage. The unique coloration of this red phase adult allows it to blend in seamlessly with a background of turkey oak leaves in the Sandhills region of North Carolina. Opposite page: An Eastern screech owl sits motionless in the entrance of its roost cavity, soaking up rays on a cold winter day. Its mottled gray coloration and ear tufts act as disruptive camouflage, allowing the owl to blend in with the background of tree bark and avoid being seen by mobbing songbirds and crows.

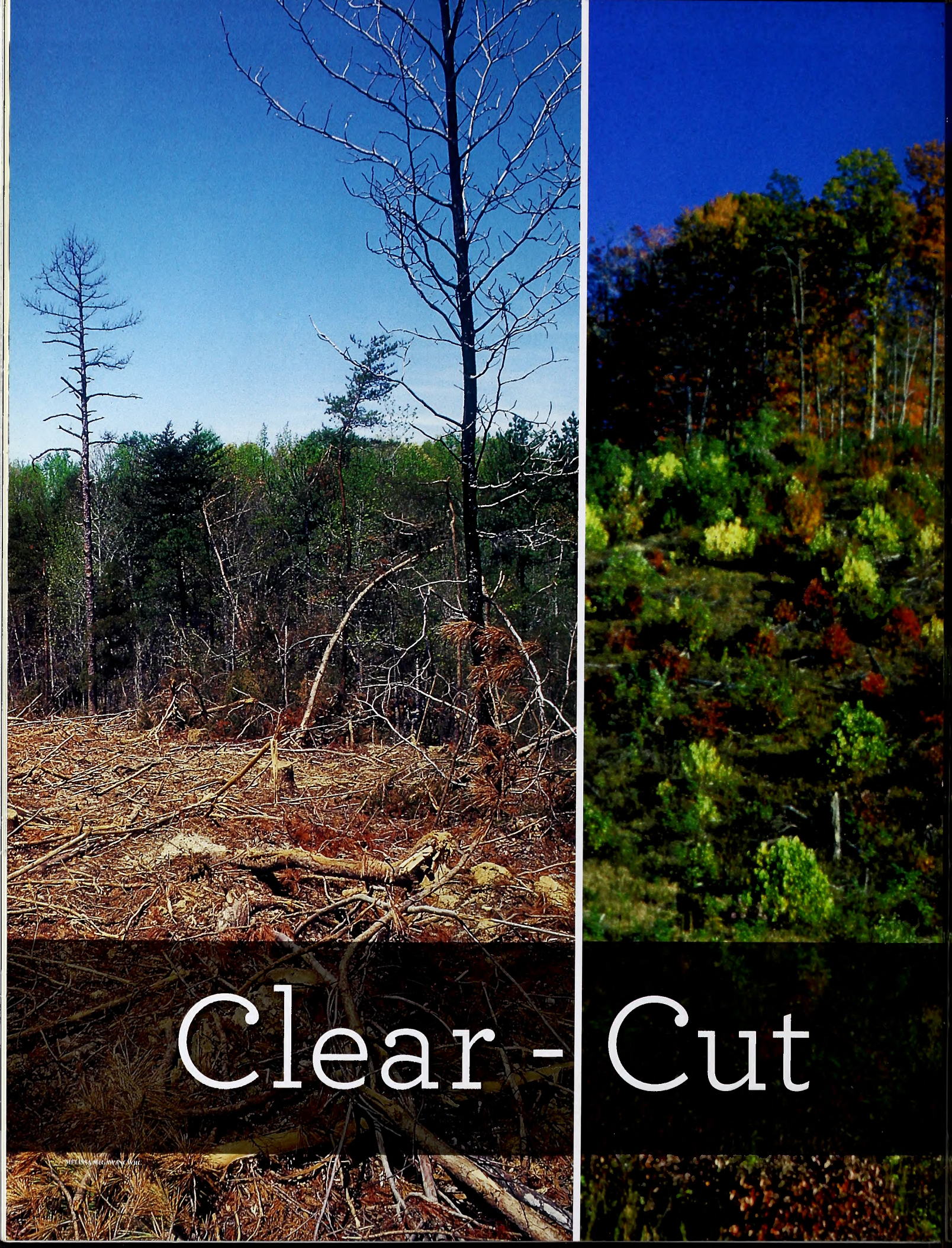
Above: A juvenile copperhead is coiled among the leaf litter in the Sandhills of North Carolina. Its coloration, consisting of broad reddish bands, allows the small snake to avoid detection from predators such as hawks. Like the rattlesnake on the previous page, it too is a sit-and-wait predator.

Right, top: Animals as large as a white-tailed deer can be incredibly difficult to observe in the woods. By standing still and having an overall body color matching the muted colors beneath a forest canopy, deer can simply disappear from view to an untrained eye. Right, middle: A sand diver rests on the seafloor in shallow water. A member of the lizardfish family, this foot-long predator relies on camouflage to blend in with the sandy bottom to ambush prey. Right, bottom: A katydid blends in with the surrounding lichen-covered rocks in the mountains along the Blue Ridge Parkway, out of the eye of wary predators such as birds.

How Does Countershading Help Animals Hide?

See Nature's Ways, page 39.

NATURE'S WAYS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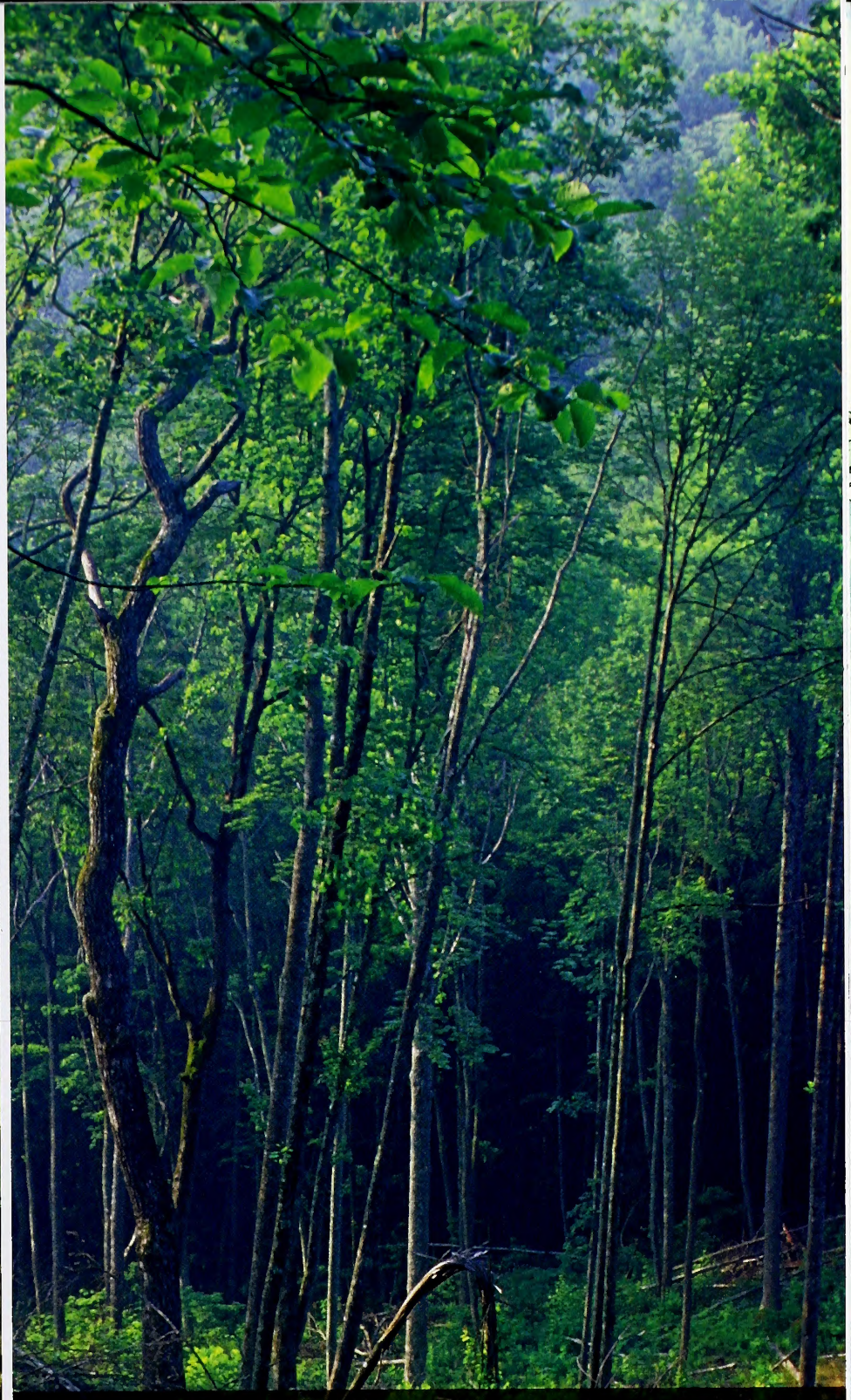


Benefits

Timber management on public lands has gotten a bad rap. Experts say it's time to reverse the trend.

Written by David Hart
Photographed by Bill Lea

As a boy growing up in the woods of western North Carolina, Steve Henson spent his autumn and winter days traipsing through the hills behind his two uncles and their English setters as they scoured the land for ruffed grouse. Henson didn't carry a gun back then. Instead, he served as his uncles' flushing dog, plowing into thick briers and vines to jump grouse that refused to fly. It was hard work, but Henson was hooked on the experience just the same.

"I was captivated by all of it, the cover, my uncles, everything, but I really loved watching the dogs work more than anything," he recalled.

Eventually, he got a few setters and struck out on his own, chasing grouse every chance he could across public and private lands throughout western North Carolina. He usually found them. Back in the 1970s, jumping 20, even 30 birds was just a normal day in the woods, and three-bird limits were fairly common. Not anymore.

Both ruffed grouse (above) and white-tailed deer (opposite) benefit from forests that are managed by cutting timber.

"Now it's more like taking the dog for a walk through the woods," he lamented. "I've had a few days where I might flush 10 birds, but that doesn't happen very often, and I've noticed a real significant drop in the last three years."

Change in the Landscape

So what happened between then and now? Grouse need stands of young forests, known as early successional habitat, which is typically created through logging or some other major forest disturbance. They aren't getting it anymore. Thanks largely to the budding environmental movement of the 1980s, timber harvest on national forestlands throughout the country plummeted from a high of 12.7 billion board-feet in 1987 to less than 2 billion in 2007. Areas that were logged 20 or 30 years ago have matured and no longer provide the habitat grouse and other wildlife need to survive. The trend is similar in North Carolina's 1.25 million acres of national forestlands. In 2007, just 2,079 acres of trees were clear-cut, thinned or otherwise managed, a nearly 75 percent reduction from a peak in 1984. The decline is even more drastic in the Pisgah and Nantahala national forests. In 2002, harvest levels were just 2 percent of what they were in 1989, although timber management activity has risen slightly since.

That's bad news for wildlife and for hunters. North Carolina lost nearly 18 percent of its hunters—66,000—between 1996 and 2006, according to a report released by the U.S. Fish and Wildlife Service. Henson, a forester and director of the Southern Appalachian Multiple-Use Council, attributed some of that decline to the loss of game,

which is directly related to a decline in suitable habitat.

"There are fewer grouse hunters for the simple fact that there are fewer grouse," he said. "Those remaining places that do have good habitat are getting a high amount of hunting pressure, which is pushing game wildlife off that prime habitat and onto less-suitable habitat."

The decline in timber harvest on federal lands isn't affecting just grouse. Deer numbers are down throughout much of western North Carolina's national forestland as a result of dwindling timber activity. Like game birds that favor early successional cover, white-tailed deer prefer diverse habitat that provides a variety of food. Not only are regenerated clear-cuts brimming with soft mast in the form of tender young shoots, leaves and buds, they also give deer a great place to hide. Without food and cover, the animals simply can't maintain populations that are acceptable to hunters and wildlife managers. That's why deer hunters in western North Carolina are either giving up their favorite pursuit altogether or hunting in other parts of the state.

"With the decline in deer numbers we have seen a decrease in the number of deer hunters on national forestland in western North Carolina," said Gordon Warburton, the N.C. Wildlife Resources Commission's wildlife supervisor for the Mountain region.

Other game species aren't necessarily declining, but Bryan Burhans, former director of land management programs for the National Wild Turkey Federation, said turkeys would benefit immensely from additional timber management on public lands, and so would turkey hunters as a result.

"Turkeys can certainly survive in even-aged mature forests, but they do much better when they have diverse habitats," Burhans explained. "Research has shown that reproduction success is higher in areas with early successional forest habitat because predators have a much harder time finding nests and poults in thick, young forests. That type of habitat also provides a far wider variety of food in the form of insects and soft mast such as berries. Adult turkeys use clear-cuts as soon as new growth comes up, as well. When you have more turkeys, you have more opportunities for turkey hunters, so timber management is beneficial all the way around."

Whenever Burhans visits property with a management plan that includes some sort of timber harvest, he sees a higher number of game and nongame species and a more diverse variety of all types of wildlife. "The difference in the amount and variety of birds and wildlife between areas that have been timbered and areas that haven't is like night and day," he added.

Mark Johns agreed. As the commission's former Partners in Flight biologist, he conducted birding workshops throughout the state. "I hold them on actively managed forests because that's where the birds are," he said.

Johns said forest disturbance, whether from fire, disease, weather or man-made efforts like logging, is beneficial to a huge number of songbirds. Many species not only flourish in early successional forests, they need them. Towhees, golden-winged warblers (a species of special concern in North Carolina), thrashers, chestnut-sided warblers and others thrive in areas of forest disturbance like older clear-cuts and thinnings.

"A number of other species don't actually live in young forests, but they use them just the same. Whip-poor-wills, nighthawks and swallows forage over them. So do bats," he said. "Those openings usually have a higher diversity of insects, which are the primary foods for a number of birds."

Bad Reputation

Logging has certainly gotten a bad rap in the last 20 years. No doubt, a freshly timbered hillside can look like an ugly scar on the face of a supermodel, at least in the few months following the logging activity. The drab grays and browns of the stumps, treetops and bare earth left behind are an unsightly contrast to the emerald green of the surrounding forest. During the environmental movement in the 1990s, activists used photographs of freshly timbered hillsides to make their case against logging and to win public support for their cause.

What they never showed, however, was that same clear-cut 10 years, five years or

Timber harvest in national forests fell from 12.7 billion board-feet in 1987 to less than 2 billion 20 years later. In North Carolina, the number of acres timbered in 2007 was down almost 75 percent from its high in 1984.

even one year later, and the diverse and abundant wildlife within. U.S. Forest Service ecologists conducted a six-year study that examined differences in soft mast production between early successional forest and mature forest habitat in western North Carolina between 1999 and 2004. They found a remarkable difference in productivity. Fruit production in the form of pokeweed, huckleberries, blackberries, dogwood berries and other soft mast that wildlife eat was five to nearly 20 times as high in three-to-five-year-old clear-cuts as in mature, closed-canopy forests.

The ecology is pretty simple. Removing tall trees with a dense canopy allows sunlight to reach the forest floor, thereby allowing shade-intolerant species of trees, shrubs and other plants to jump. Although there are species of plants that are shade tolerant, they don't provide much benefit to wildlife. New sun-nourished growth is precisely what feeds wildlife such as deer and turkeys or provides nesting habitat, said Warburton. In some instances, plants spring up almost immediately after mature trees have been cut. The sprouts of new trees emerge from freshly cut stumps, and seeds that lay dormant for years also respond to the sunlight that never reached the ground in a mature forest.

It's not just wildlife that is suffering. Ironically, the decline in timber cutting and other active management such as fire is also leading to a change in the forest composition itself, a change that concerns biologists throughout the southern Appalachians. Warburton said we are slowly losing some of the most important trees in our ecosystem — oaks, which provide a vital source of food to dozens of species of birds and mammals.

"Young oaks are not very shade tolerant, and they are being outcompeted by such shade-tolerant species as maples and poplars. Unfortunately, those species don't provide the benefit to wildlife that mature oaks do," noted Warburton. "This could become a crisis in 50 years as oaks continue to decline in mature forests."

Henson admitted that the growing environmental movement did have some benefits. It not only forced unscrupulous loggers to heed regulations that were sometimes ignored, it also forced forest managers to develop methods and practices that had a lower impact on the ground and the surrounding habitat. As a result of those changes, water quality around timber cuts improved, and problems associated with erosion from roads also got better.

MELISSA McGAW/NCWRC

Although clear-cuts look barren, vegetation quickly regenerates, providing food for many species of animals. A recent study found that fruit production of wild plants in clear-cuts was up to 20 percent higher than in untimbered areas.

"We now have the research and technology to get in and get out with little or even no long-term impact," said Henson.

James Vose, a forest watershed scientist at the Forest Service's Coweeta Research Station near Franklin, said decades of research has shown that when best management practices are followed, timber management, even clear-cutting, has little long-term impact on water quality in adjacent streams. "Stream chemistry responses are typically very low and short-lived due to the rapid regrowth after cutting in forests in the South," he said.

No one is suggesting a wholesale cutting of the state's national forests. Warburton and other biologists agree that plenty of places with mature timber demand preservation. Warburton also acknowledges that some birds and mammals need mature forests and the habitat they provide. Ideally, however, he and other biologists would like to see a mosaic, a broad mix of ages of trees within large expanses of forested land. Various forms of timber management, from clear-cuts to shelterwood cuts to thinnings, all serve wildlife in ways that vast stands of mature timber can't.

And although fire may have been an integral part of North Carolina's forest ecosystems 50 or more years ago, the general public is typically no longer tolerant of forest fires; most are extinguished quickly to prevent loss of private property. Many agencies, including the U.S. Forest Service and the Wildlife Commission, promote the use of fire and conduct prescribed burns annually, but management by chain saw is still one of the best available methods of creating forest diversity. And it usually pays for itself.

"This isn't about being pro-timber harvest or anti-timber harvest," insisted Warburton. "It's about being pro-wildlife. And the case for cutting more trees isn't just about providing more game for hunters, either. It's about providing critical habitats for all types of wildlife."

But, he insisted, hunters should matter when it comes to management decisions on public land. Not only are they one of the primary user groups of the state's national forests, they inject millions of dollars into local economies. And they are some of the best advocates for North Carolina wildlife — all types of wildlife.

David Hart is an outdoors writer living in Rice, Va., and occasional contributor to Wildlife in North Carolina.

You'd think an animal weighing half a ton would be tough to hide. But giant tuna fish keep many secrets. They're

Mysterious, Magnificent Bluefins

written by Julie Dunlap
illustrations and nature activity by Anne M. Runyon

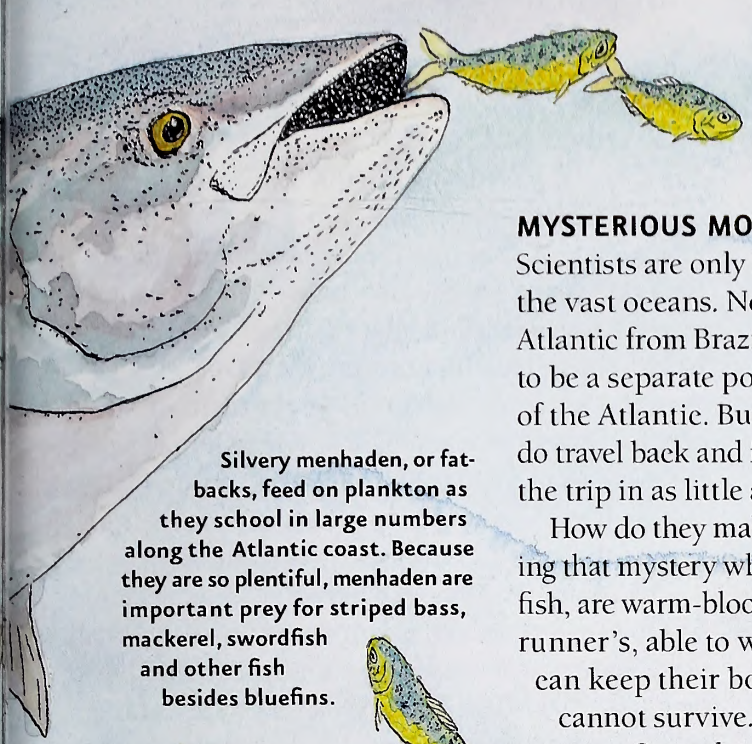
One way to hide a bluefin is in a crowd of other fish. How can you tell which is which?

WHICH FISH IS WHICH?

Bluefins belong to a family called Scombridae, which includes king mackerel, wahoo and other fast-moving ocean fish. The 55 members of Scombridae race through the world's temperate and tropical oceans, chasing smaller fish, squid and other swimming prey. All have football shaped bodies, retractable fins and powerful tail muscles—family traits that help them swim fast and far.

Some of the fastest in the family are tunas. Their scientific name, *Thunnus*, even comes from a Greek word meaning "to rush." Blackfin, yellowfin and bigeye tunas slice through North Carolina waters at least part of each year. But the fastest—and biggest—of all are giant bluefins (*Thunnus thynnus*). Also called horse mackerel or common tunny, a bluefin can swim as fast as a racehorse can run and can weigh as much as a moose. From November to April, though you might not see them, giant bluefins are schooling and hunting off the Outer Banks.

Bluefins usually school with other fish the same size. Imagine a school with hundreds of 1,000-pound pupils!



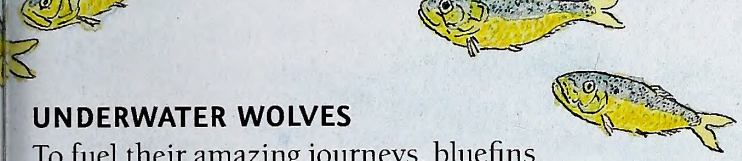
Silvery menhaden, or fatbacks, feed on plankton as they school in large numbers along the Atlantic coast. Because they are so plentiful, menhaden are important prey for striped bass, mackerel, swordfish and other fish besides bluefins.

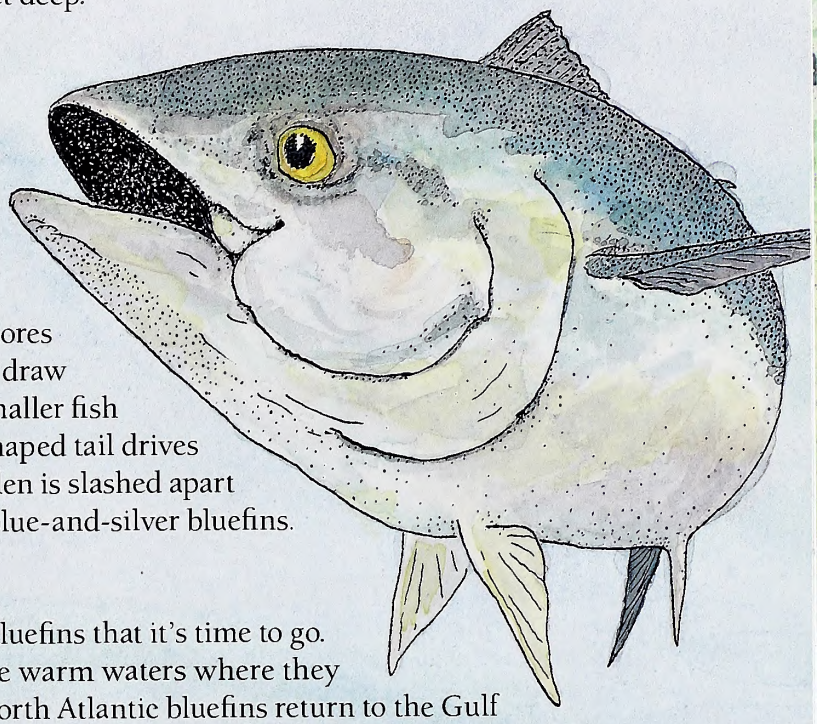
MYSTERIOUS MOVEMENTS

Scientists are only beginning to understand where bluefins travel in the vast oceans. Northern bluefins have been found in the western Atlantic from Brazil to Newfoundland. These fish were long believed to be a separate population from bluefins living on the eastern side of the Atlantic. But recent tagging studies have shown that bluefins do travel back and forth across the Atlantic Ocean, sometimes making the trip in as little as 60 days.

How do they make such long, swift journeys? Scientists began solving that mystery when they discovered that bluefins, unlike most other fish, are warm-blooded. Their muscles are like a warmed-up marathon runner's, able to work long and hard for great distances. Plus, they can keep their bodies warm in deep, cold waters where other fish cannot survive.

Once thought to feed mostly at the surface, bluefins tagged with depth recorders have been found to dive over 3,000 feet deep.





UNDERWATER WOLVES

To fuel their amazing journeys, bluefins must eat and eat. Luckily, they're not picky. Huge schools of tuna gobble mackerel, herring and sand lances like starving customers at a seafood buffet.

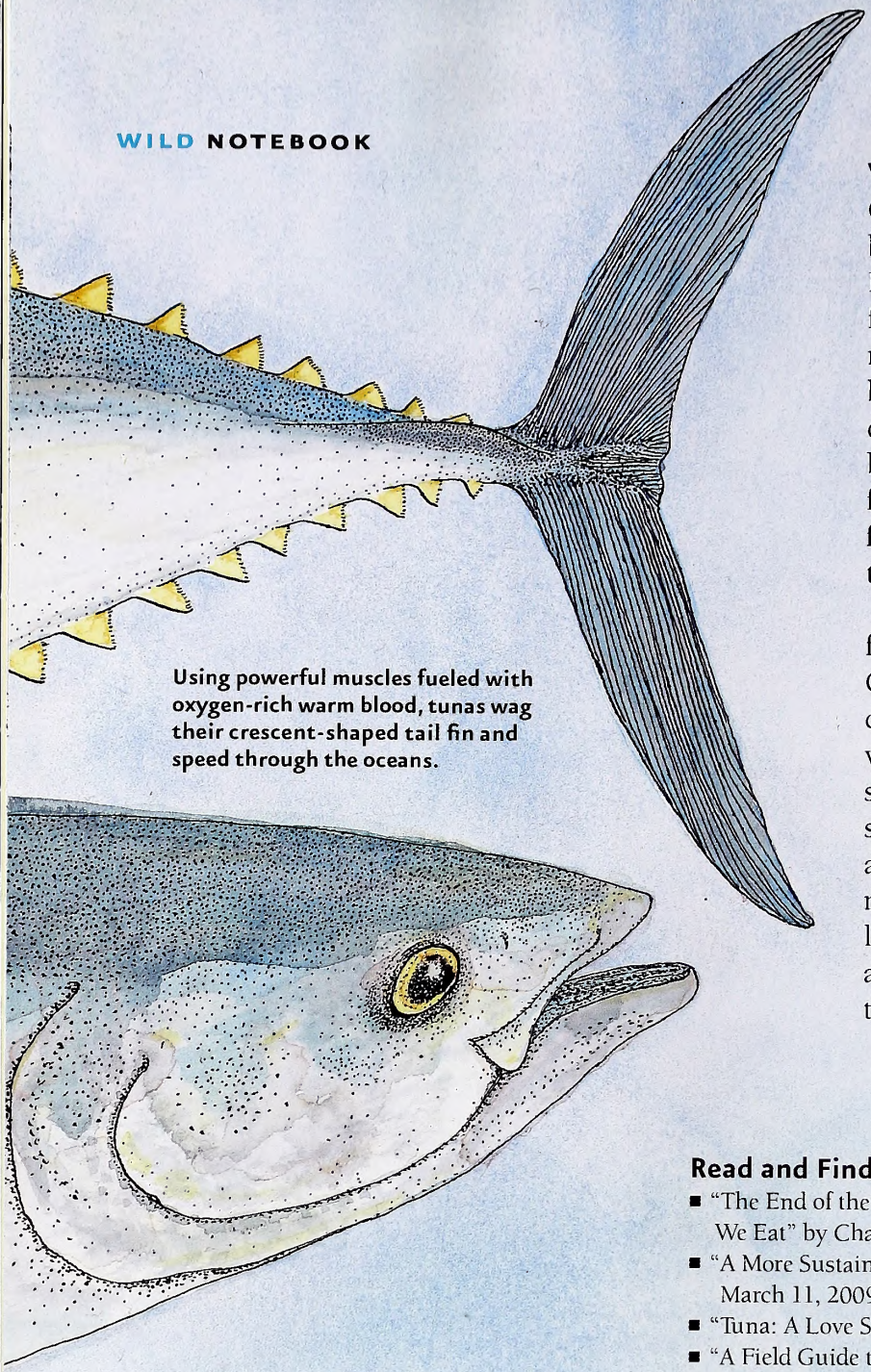
Off North Carolina, though, bluefin have a favorite menu item: menhaden. Watermen didn't notice bluefins off our shores until the 1990s, but many believe that crowds of menhaden draw them here each year in late fall. The tuna chase down the smaller fish like great packs of giant wolves. Each stroke of a crescent-shaped tail drives a bluefin closer to its prey. Soon the darting mass of menhaden is slashed apart by surging predators. The water seems to boil with leaping blue-and-silver bluefins.

TUNA'S BIGGEST SECRET

In spring, an unknown signal tells adult bluefins that it's time to go. Like salmon, tuna can somehow find the warm waters where they hatched five to eight years before. Some north Atlantic bluefins return to the Gulf of Mexico in April; others head for the Mediterranean Sea in June. Still others may seek out a part of the Gulf Stream that scientists have not yet discovered.

No one has ever seen giant bluefins spawning. But we know that each female releases 10 million tiny, transparent eggs that are fertilized in the water. They hatch in a few days into big-eyed, bubble-headed, finless babies. These flea-sized larvae grow fast by feeding on even tinier plankton.

But most bluefin larvae end up in the stomachs of fish, dolphins, sea birds and other predators. Lucky larvae that escape all the hungry mouths may live to be 30 years old. They're not considered "giants" until they weigh at least 300 pounds. But scientists estimate that less than one in a million baby bluefins reaches adulthood.



Using powerful muscles fueled with oxygen-rich warm blood, tunas wag their crescent-shaped tail fin and speed through the oceans.

VANISHING ACT

Only three top predators can threaten an adult giant bluefin: orcas, great white sharks and humans. People have prized the tuna's buttery pink meat for 4,000 years. For the last century, sports fishermen have also treasured the challenge of landing a hard-fighting bluefin. But since the 1970s, global demand for tuna, especially in the form of raw bluefin, has skyrocketed. A single fish may sell for more than $100,000 in Japan. Commercial fishing fleets send out planes to spot schools from the air, then rush to capture their fortune.

The relentless, high-tech harvest is driving bluefins toward extinction. Scientists estimate that the Gulf of Mexico population has shrunk over 80 percent in the last 40 years. But scientists are teaming with conservationists to protect the species. Using satellites and other high-tech tools, researchers are studying key questions such as: How many bluefins are left? What are their critical habitats? And how many can be harvested without harming the population? We may not always know where bluefins are or what they're doing, but no one wants them to disappear forever.

Get Outside

Go fishing! You may not have a chance to haul a giant bluefin out of the deep blue sea, but you can bait a hook and find out what swims in your local pond or stream. If you get a lucky strike, compare your catch to what you know about tuna. Notice differences in shape, color, fins and muscles. Imagine how differences between the animals affect what they eat and what eats them. If your fishing is catch-and-release, think about what kinds of things you'd learn if you tagged your fish with high-tech monitors. And if your fish is headed for the frying pan, consider your role as a top predator in the aquatic food chain. How many fish can people catch and still leave plenty for other fish-eaters?

Read and Find Out

- "The End of the Line: How Overfishing is Changing the World and What We Eat" by Charles Clover, The New Press, 2006.
- "A More Sustainable Tuna?" by Juliet Eilperin, *The Washington Post*, March 11, 2009.
- "Tuna: A Love Story" by Richard Ellis, Knopf, 2008.
- "A Field Guide to Atlantic Coast Fishes" by C. Robins, Houghton Mifflin, 1999.

In *Wildlife in North Carolina:*

- "Tuna Online" by Chris Powell, January 2002.

On the World Wide Web:

- Atlantic Bluefin Tuna National Geographic profile
  http://animals.nationalgeographic.com/animals/fish/bluefin-tuna.html
- PBS films: Empty Oceans, Empty Nets (2002) and Farming the Seas (2004)
  www.pbs.org/emptyoceans/aboutfilms.html
- Tag-A-Giant Foundation
  http://tagagiant.org
- Tuna Research and Conservation Center
  www.tunaresearch.org

Find out more about Project WILD Workshops and literature at the Wildlife Commission's Web site at www.ncwildlife.org.

Make a Bluefin Tuna and Great White Shark Mobile

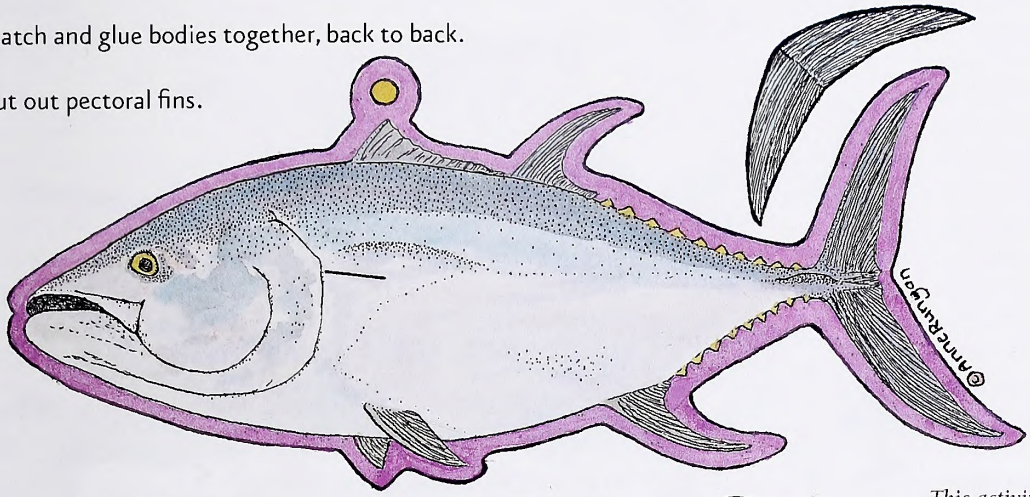
Bluefin tuna and great white sharks must swim with their mouths open to keep oxygen-rich water flowing over their gills. If they stop swimming, they can't breathe.

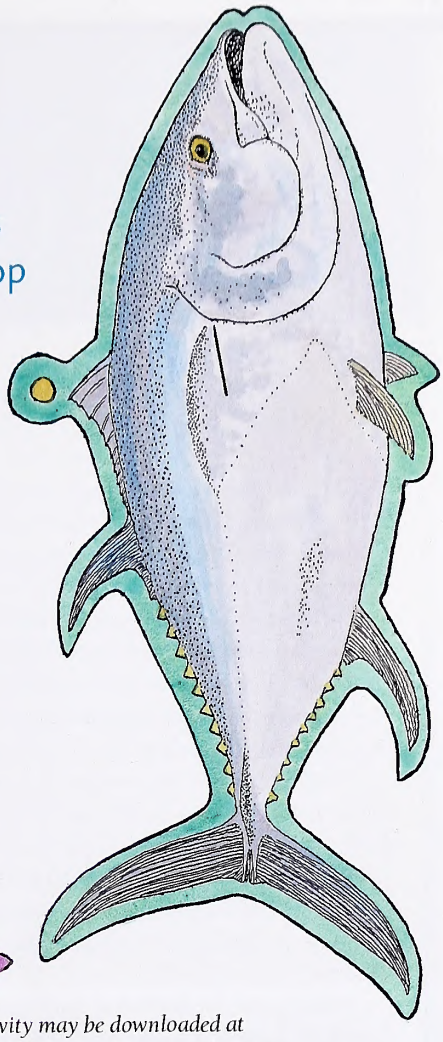
1) Enlarge your tuna and shark designs by 135%, and print them separately. (65 lb. cover stock paper works well.)

2) Cut out bodies, leaving the colorful borders around each fish.

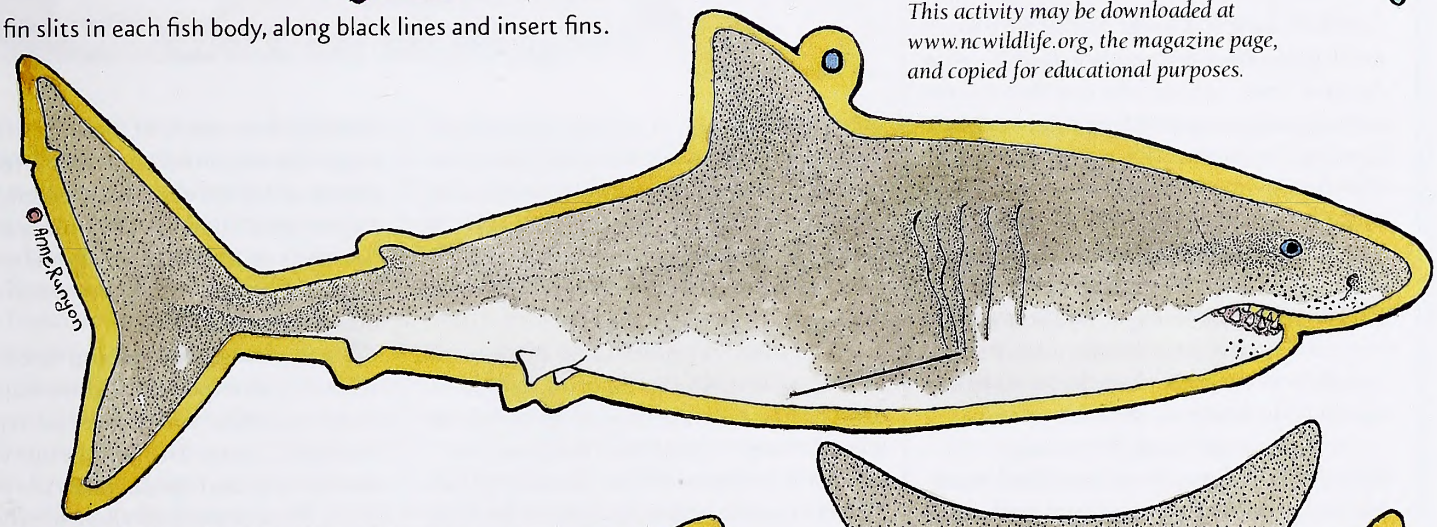
3) Match and glue bodies together, back to back.

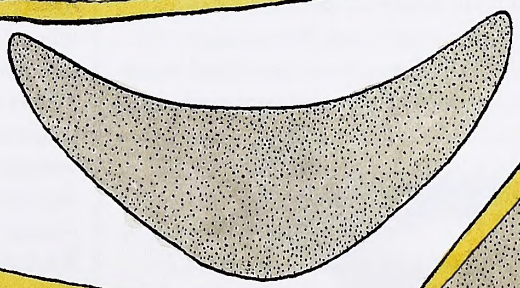
4) Cut out pectoral fins.



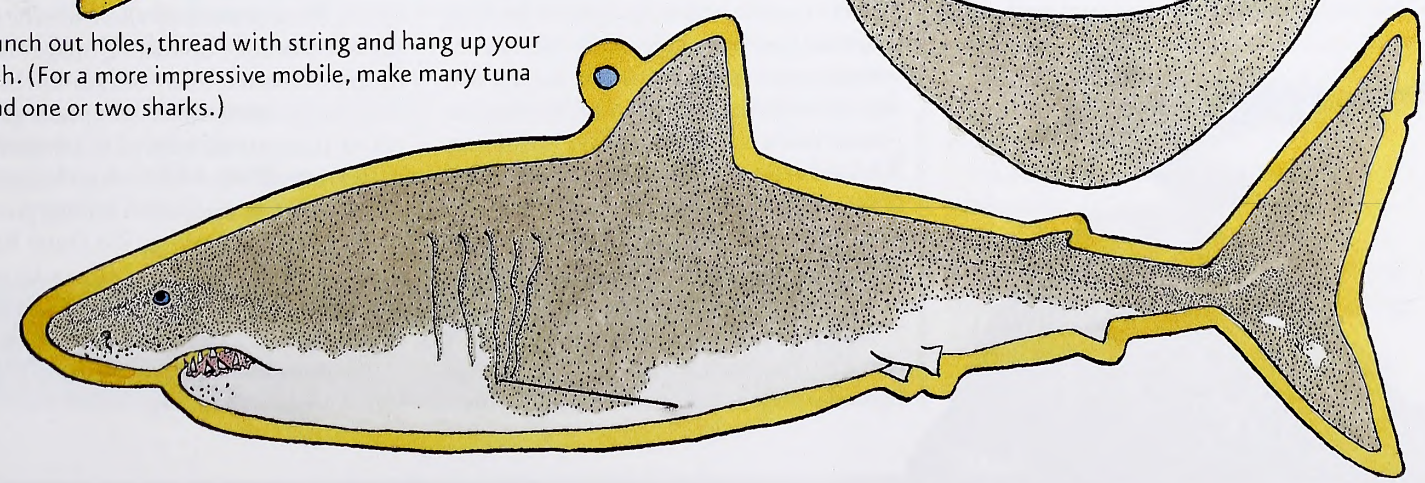


5) Cut fin slits in each fish body, along black lines and insert fins.





6) Punch out holes, thread with string and hang up your fish. (For a more impressive mobile, make many tuna and one or two sharks.)



This activity may be downloaded at www.ncwildlife.org, the magazine page, and copied for educational purposes.

Time to Count Those Backyard Birds

Bird watchers coast to coast will take part in the 13th annual Great Backyard Bird Count, Friday, Feb. 12, through Monday, Feb. 15. Participants in the free event will join tens of thousands of volunteers of all levels of birding experience to count birds in their own back yards, local parks or wildlife refuges.

Each checklist submitted by these citizen scientists helps researchers at the Cornell Lab of Ornithology and the National Audubon Society learn more about how the birds are doing—and how to protect them. Last year, participants turned in more than 93,600 checklists online, creating the continent's largest instantaneous snapshot of bird populations ever recorded.

"Taking part in the Great Backyard Bird Count is a great way to get outside with family and friends, have fun and help birds—all at the same time. Anyone who can identify even a few species can provide important information that enables scientists to learn more about how the environment is changing and how that affects our conservation priorities," said Judy Braus, Audubon education vice president. "Everyone who participates in the GBBC—families, teachers, and young people—will get a chance to hone their observation skills, learn more about birds, and make a great contribution to the future."

Anyone can take part in the Great Backyard Bird Count, from novice bird watchers to experts. Participants count birds for as little as 15 minutes (or as long as they wish) on one or more days of the event and report their sightings online at www.birdcount.org. One 2009 participant said, "Thank you for the opportunity to participate in citizen science. I have had my eyes opened to a whole new interest and I love it!"

MASLOWSKI WILDLIFE PRODUCTIONS

"The GBBC is a perfect first step towards the sort of intensive monitoring needed to discover how birds are responding to environmental change," said Janis Dickinson, the director of Citizen Science at the Cornell Lab. "Winter is such a vulnerable period for birds, so winter bird distributions are likely to be very sensitive to change. There is only one way—citizen science—to gather data on private lands where people live and doing this across the continent over many years. GBBC has enormous potential both as an early warning system and in capturing and engaging people in more intensive sampling of birds across the landscape."

Bird populations are always shifting and changing. For example, 2009 GBBC data highlighted a huge southern invasion of pine siskins across much of the eastern United States. Participants counted 279,469 pine siskins on 18,528 checklists, as compared to the previous high of 38,977 birds on 4,069 checklists in 2005. Failure of seed crops farther north caused the siskins to move south to find their favorite food.

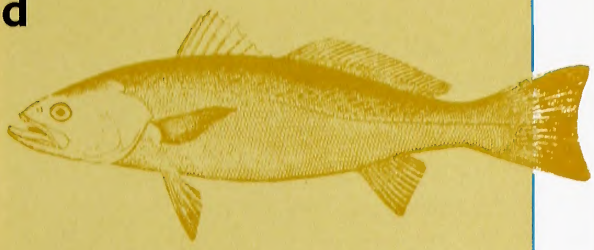
On the www.birdcount.org Web site, participants can explore real-time maps and charts that show what others are reporting during the count. The site has tips to help identify birds and special materials for educators. Participants may also enter the GBBC photo contest by uploading images taken during the count. Many images will be featured in the GBBC Web site's photo gallery. All participants are entered in a drawing for prizes that include bird feeders, binoculars, books, CDs and many other birding products.

Bird watchers may go the Outer Banks Center for Wildlife Education to take part in the count. Visit www.ncwildlife.org or call (252) 453-0221, ext. 3, to reserve a spot.

For more information about the GBBC, visit www.birdcount.org.

MASLOWSKI WILDLIFE PRODUCTIONS

Weakfish Limit Slashed



The Atlantic States Marine Fisheries Commission's (ASMFC) Weakfish Management Board has approved measures to reduce weakfish exploitation by over 50 percent in both the recreational and commercial sectors. States must implement a one-fish recreational creel limit, 100-pound commercial trip limit, 100-pound commercial bycatch limit during closed seasons, and 100 undersized fish per trip allowance for the finfish trawl fishery. Those creel limits must be in effect by May 1.

North Carolina currently allows six fish per day of at least 12 inches. The size limits for all states will remain at current lengths.

The board's action came in response to the stock status of weakfish, also known as gray trout. A recent peer-reviewed assessment found the weakfish stock to be depleted, with the stock at an all-time low of 10.8 million pounds of age 1+ fish along the Atlantic coast. The decline in biomass reflects a sustained rise in natural mortality after 1995, rather than fishing mortality which has been modest and stable over the same time period.

According to the ASMFC's report, "At this stock size, recent fishery removals [landings and dead discards combined] represent a significant proportion of the remaining biomass. While the decline in the stock primarily results from a change in the natural mortality of weakfish in recent years, it is further exacerbated by continued removals by the commercial and recreational fisheries. Natural mortality has risen substantially since 1995, with factors such as predation, competition, and changes in the environment having a stronger influence on recent weakfish stock dynamics than fishing mortality. Given current high natural mortality levels, stock projections indicate that the stock is unlikely to recover rapidly, even under a harvest moratorium."

Between 1982 and 1990, the age 1+ biomass declined from 113.1 million pounds to 17.6 million pounds. The ASMFC blames overfishing for about 60 percent to 90 percent of that total mortality.

"The board received a significant amount of public comment supporting a coastwide moratorium," said board chair Roy Miller. "In recognition of this, it chose to implement measures that would discourage directed fishing, limit bycatch mortality, and ensure that critical sampling programs remain on track."

While the decline appears to have resulted from a change in the natural mortality of weakfish in recent years, it is further exacerbated by continued removals by commercial and recreational fisheries. However, given the high mortality levels, the stock is also unlikely to recover rapidly. The addendum's measures are intended to reduce the level of harvest without creating a large amount of discards.

In North Carolina, commercial landings of weakfish were only 170,394 pounds in 2008 compared to 685,469 in 2004. The recreational catch in 2008 was 136,471 pounds compared to 273,685 in 2004.

Check Off for Nongame

North Carolina can claim more than 1,000 nongame mammals, reptiles, birds, amphibians, mollusks and crustaceans. Nongame wildlife includes all wild animals except those that can legally be taken by hunting and fishing. Many nongame species are common and can be viewed in your own backyard. Others are rare and seldom seen.

The Nongame and Endangered Wildlife Program strives to prevent species from becoming endangered through maintaining viable, self-sustaining populations of all native wildlife, with an emphasis on species in decline.

The Nongame Program is part of the Division of Wildlife Management of the N.C. Wildlife Resources Commission. Funding for the program is provided in part by the N.C. Tax Check-Off for Nongame and Endangered Wildlife. The tax check-off enables North Carolina taxpayers to donate a portion of their state income tax refund to nongame wildlife conservation.

To contribute to the Nongame and Endangered Wildlife Fund, please enter an amount on line 26 of your North Carolina income tax form. If you are not eligible for a refund but would still like to contribute towards nongame wildlife conservation, send your donation to: Nongame and Endangered Wildlife Fund, 1722 Mail Service Center, Raleigh, N.C. 27699-1722. All donations are tax-deductible.

Since it began in 1983, the Nongame Program has funded projects to help sea turtles, bald eagles, peregrine falcons, freshwater mussels and many other native species.

e NEWSLETTER

Get N.C. Wildlife Update—news including season dates, bag limits, legislative updates and more—delivered to your Inbox from the N.C. Wildlife Resources Commission. Sign up at www.ncwildlife.org/enews.

Wildlife Arts Festival Features N.C. Print

The N.C. Wildlife Resources Commission will unveil its 2010 waterfowl stamp and print at the opening reception of the 15th Annual East Carolina Wildlife Arts Festival on Friday, Feb. 5, in Washington. Sponsored by the East Carolina Wildfowl Guild, the reception, which begins at 7 p.m., will be held at the Washington Civic Center.

The commission initiated a Waterfowl Conservation Stamp and Print program in 1983 to generate funds for waterfowl conservation in the state, including acquiring and improving habitat. Money from the sale of stamps and prints goes into the waterfowl fund. For the third year, the winner of the stamp competition will be determined from a national contest.

The festival continues on Saturday and Sunday, Feb. 6–7, with carving competitions, contests for duck, goose and turkey callers, and retriever demonstrations. A buffet dinner and auction will be held Saturday beginning at 7 p.m.

For more information, visit www.ncwildfowlguild.com.

IN SEASON

This month, these seasons are open in North Carolina:

Bobcat: Through Feb. 28.
Common Snipe: Through Feb. 27.
Crow: Through Feb. 28.
Grouse: Through Feb. 28.
Hatchery Supported Trout Waters: Through Feb. 28.
Pheasant: Through Feb. 1.
Quail: Through Feb. 28.
Rabbit: Through Feb. 28.
Raccoon and Opossum: Through Feb. 28.
Squirrel: Gray and red through Feb. 13.
White-tailed Deer: Urban archery through Feb. 13.
Wild Boar: Through Feb. 28 only in Cherokee, Clay, Graham, Jackson, Macon and Swain counties. In the other 94 counties of the state, feral hogs are not considered to be wild boars, and the commission does not regulate them.

Migratory Waterfowl
Dark Geese (Canada and white-fronted): Resident Population through Feb. 6.
Snow, Blue and Ross' Geese: Through March 10.
Youth Waterfowl Day: Feb. 6.

There is no closed season or bag limit for groundhog, coyote, striped skunk and nutria. There is an open season for taking beaver with firearms during any other open season for the taking of wild animals.

Check the *2009–2010 North Carolina Inland Fishing, Hunting and Trapping Regulations Digest* for bag limits and applicable maps or visit www.ncwildlife.org.

Forest Service Closes Tellico OHV Trails

The U.S. Forest Service has permanently closed the Upper Tellico off-highway vehicle (OHV) trail system in order to correct serious erosion problems in the Upper Tellico River watershed in Cherokee County.

"When we first began our analysis we hoped we could make repairs and modifications to the existing OHV trail system that would correct the water quality problems while still allowing for some level of OHV use in this area to continue," said National Forests in North Carolina Supervisor Marisue Hilliard. "Unfortunately we discovered that repairing the existing problems and maintaining these Upper Tellico OHV trails in the future would be much more difficult than we expected."

"Our analysis has shown the problems to be worse than we first thought," Hilliard said. "The 39-mile Upper Tellico OHV trail system is currently contributing unacceptable levels of sediment into the Tellico River and its tributaries. The Forest Service is in violation of its own standards and North Carolina state water quality standards because visible sediment from the OHV trails is reaching the Tellico River and its tributaries in hundreds of locations. Many of the trails are on steep slopes and they all occur on very erodible soils. Much of the Tellico OHV trail system runs parallel to streams in the area, with over six miles within 100 feet of streams. The locations of these trails make it extremely difficult to prevent sediment from reaching the streams even if we are successful in repairing existing problems."

In February 2009, the Forest Service sought public comment on a detailed environmental assessment which looked at six alternatives for future management of the Upper Tellico OHV trail system, including a preferred alternative of closing the OHV trail system.

U.S. FOREST SERVICE

"After carefully considering the 2,400 public comments we received and thoroughly reviewing all alternatives in the environmental assessment, I have selected Alternative C, which closes the OHV system," said Hilliard. "While we are closing the 39-mile OHV trail system we will be keeping 13 miles of FS system roads in the area open year-round or seasonally for highway legal vehicles. This will provide access for hunting, fishing and other recreation activities. Closed roads and trails will be stabilized and rehabilitated to eliminate future sedimentation into the Tellico River."

"While I realize that our OHV recreationists are understandably disappointed with this decision on Tellico, I want to reassure our OHV users that we are committed to maintaining other OHV trail opportunities on the National Forests in North Carolina which are located on more suitable sites," Hilliard said.

Other national forest OHV trail systems in North Carolina include:

- **Wayehutta, Nantahala,** 21 miles (21 miles ATV and motorcycle)
- **Brown Mountain, Pisgah,** 34 miles (6 miles 4WD, 27 miles ATV, 34 miles motorcycle)
- **Badin Lake, Uwharrie,** 16 miles (16 miles 4WD, ATV and motorcycle)
- **Black Swamp, Croatan,** 8 miles (8 miles 4WD, ATV and motorcycle)

CALENDAR OF EVENTS

Sunday–Saturday, February 7–13

Learn from statewide activities, events, demonstrations and displays during Prescribed Fire Awareness Week. Multiple organizations teach the importance of prescribed fire in North Carolina ecosystems. Visit www.ncprescribedfirecouncil.org to find events in your area.

Saturday, February 27

Add to your enjoyment of fishing by attending Fly-Tying for the Beginner at the Pisgah Center for Wildlife Education in Pisgah Forest. Limited to eight participants ages 12 and up. Equipment and materials provided. A $20 registration fee will be refunded upon class attendance. Visit www.ncwildlife.org.

Learn how to attract birds, butterflies and other wildlife to your own backyard at the Outer Banks Center for Wildlife Education in Corolla. Discover the four components of habitat and how to put native plants to work for you. Limited to those 14 years old and up. For reservations, book online or call (252) 453-0221, ext. 3 Visit www.ncwildlife.org.

Readers should check with the contact listed before traveling to an event. Items for listing should be conservation-oriented and should be submitted at least four months in advance to jim.wilson@ncwildlife.org, or call (919) 707-0177.

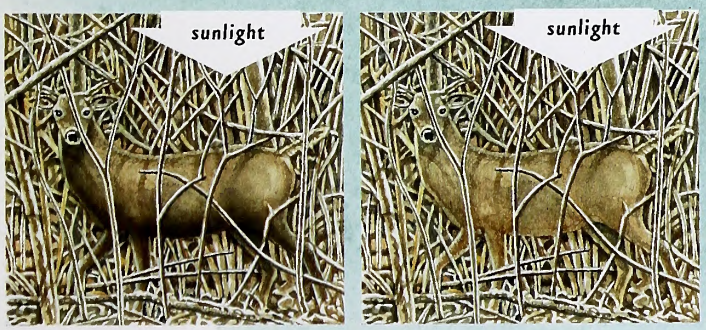
How Does Countershading Help Animals Hide?

written by Clyde Sorenson
illustrated by Jim Brown

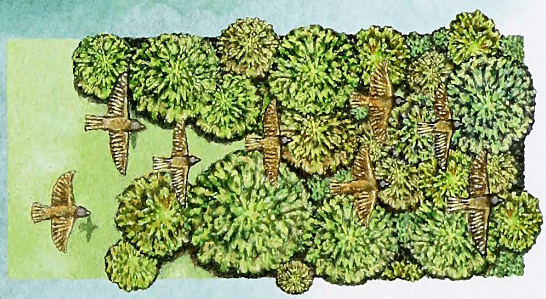
FOR MOST ANIMALS, MOST OF THE TIME, the key to eating but not being eaten is not being seen. Many animals exploit camouflage, in the form of colors and patterns that disrupt their shapes, to help them blend in to their backgrounds. But in most cases, the illusion is not complete without countershading.

If an animal is colored uniformly from top to bottom, the underside of the critter would appear much darker than the top under illumination from above (which, in nature, is pretty much the only direction from which illumination emanates) because of the shadow cast by the upper parts of the animal.

A countershaded animal is lighter in color on the underside than it is on the top—and the lighter coloring, in combination with the shadow, results in an animal that is more or less uniform in tone from top to bottom. The animal thus loses dimensionality, and the belly (and shape) defining shadow on the underside is dramatically reduced, making the animal much less distinguishable to a predator (or to prey) when viewed from the side.



without countershading *countershading*



Furthermore, a countershaded fish or bird with a dark back, when viewed from above, is much harder to pick out from a complex background, while a light underside can make it more difficult to distinguish when viewed from below against the surface of the sea or a sun-dappled forest canopy.

Tail Over Teacup

written by Jim Dean

Anthropologists continue to discover fossils of our early ancestors, steadily pushing the timeline that charts our human-like origins back into the distant past. The evidence suggests that creatures arguably kin to us were shuffling around in what is now Ethiopia at least four million years ago, give or take a few eons. One of the key determinants that anthropologists look for—and one that distinguishes us from other animals—is the preference to stand and walk upright on two legs.

AMY ELLSWORTH

I am prepared to accept that this has proven to be an evolutionary advantage over the long haul, but my own experience suggests that we sacrificed more than speed when we swapped the stability of four legs for two. From the moment we take our first tentative upright steps (recorded on film by exultant parents), we place ourselves at the risk of toppling over and bumping our heads on a coffee table.

"I don't believe I fall down more often than the average person, but neither did the late President Gerald Ford."

We clearly pay a price for being bipedal, and Mom is not always going to be around to comfort us, much less witness all the imaginative and ungraceful ways we contrive to dismount throughout a lifetime.

I don't believe I fall down more often than the average person, but neither did the late President Gerald Ford. What we shared is a gift for spectacle in the presence of witnesses.

My specialty is the aquatic tumble, a sub-category well known to most anglers who wade rivers or fish from boats. It is not unknown among waterfowl hunters, either. As an added refinement, I may hold some record for floating my hat while I have an expensive camera around my neck.

At last count, I have fallen into the water carrying (not all at once) a Pentax, two Nikons, two Olympuses (Olympi?), a Rolleiflex and a Crown Graphic. My excuse is that you can't take photographs with a camera that you have left at home or in the car. But I have also learned that you can't shoot pictures with one that's dripping wet, either.

Most of these events are unworthy of record, but my companions maintain that the way I killed the Pentax was artistic. With the camera in hand, I stepped from a dock to the gunwale of a boat, and watched with horror as the gap widened until my legs were essentially horizontal. After a few quivering moments, I slowly pivoted forward and plunged headfirst. When my buddies finished applauding, they fished me out.

On another occasion—this time with a Nikon around my neck—I declined to follow my old friend A.J. Johnson laboriously, but safely, through a thicket of rhododendron and decided to make a controlled slide down the steep face of a house-sized rock beside the falls on Gragg Prong. My plan worked fine until I hit a patch of wet leaves. Johnson later observed that my sudden acceleration and lift-off over the final precipice into the pool were worthy of a Buster Keaton movie.

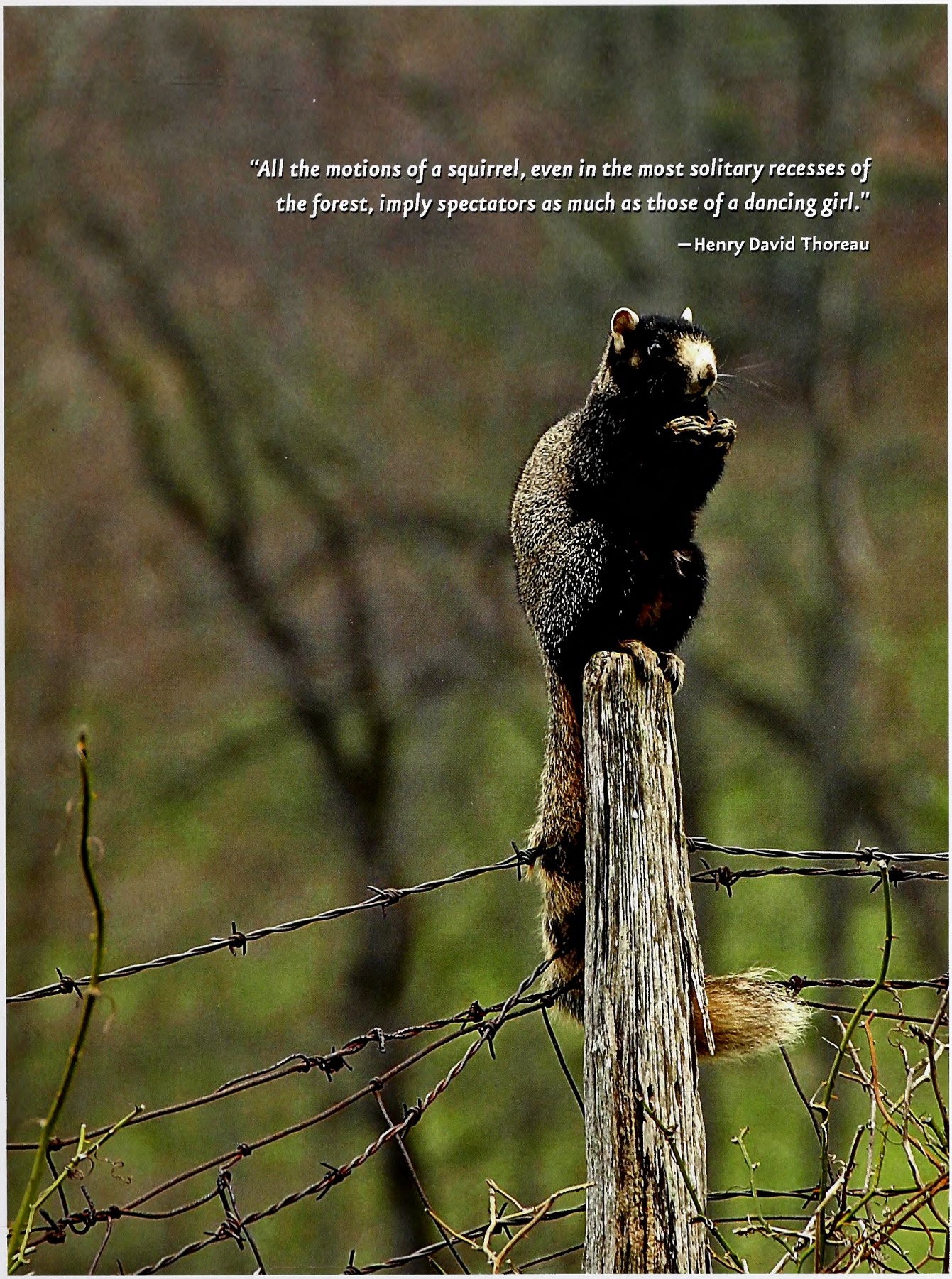
I have grown less bold of late. I now carry a folding wading staff, and I use it anytime I am wading in water much over ankle deep. I know it makes me look like a wuss, but I am more likely to be a dry wuss. I also use a makeshift staff—an old tobacco stick—when I'm duck hunting. A staff serves nicely as a third leg when you're wading through gooey marsh muck.

As you might expect, the disadvantages of falling are amplified when you break ice doing it. A wading staff—or even four legs—would not have helped one of my duck hunting buddies (whose name I think it best not to reveal). He made a misstep while gathering up his gear at the end of the hunt, and fell backward out of the blind through an inch of ice into several feet of water. At first, he decided he could walk half a mile back to the car carrying what gear he could manage. At least that's what he hollered out to tell us as we were picking up the decoys.

We weren't terribly concerned as we came along behind him 20 minutes later, but then we discovered the trail of gear and clothing he'd shed—shell box, gun, coat, shirt, pants, boots and, a few yards short of the car, his soggy socks and underwear.

The car was running with the windows steamed. When we opened the door, he was pasted to the blasting heat vents. "If this car hadn't started and had a good heater, I believe I would be dead," he pronounced fiercely. "I'm done with duck hunting, and I don't care how you explain me being naked to the wildlife guys at the checkout station, either."

The wildlife folks didn't ask, we didn't tell, and I didn't detect any suppressed snickers. Well, at least not until our buddy had dressed in warm, dry clothes and thawed enough to hold steady a glass of single-malt scotch.



JASON PIERCE

Fox squirrel

OUTDOOR MOMENT

IN THE MARCH ISSUE

CHERYL A. ERTELT

LOONY TUNES

The common loon is a regular winter visitor with a colorful history in coastal North Carolina.

LICENSE, PLEASE

A number of course options are available before the state's new boating education law comes into effect this spring.

SNAPPERS AND CHOPPERS

Bluefish populations have rebounded strong after some declines, and the fish are as mean as ever.

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WILDLIFE
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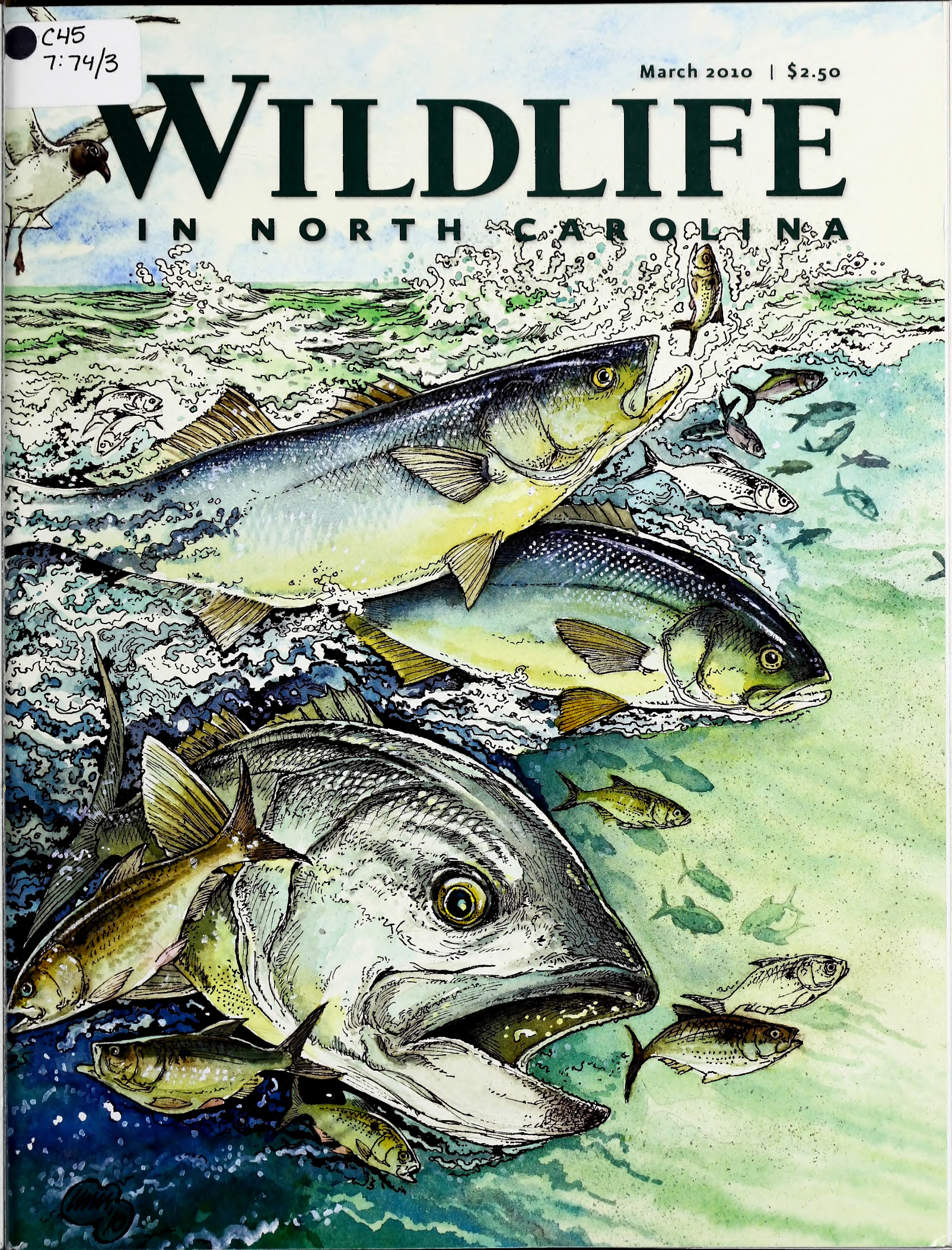
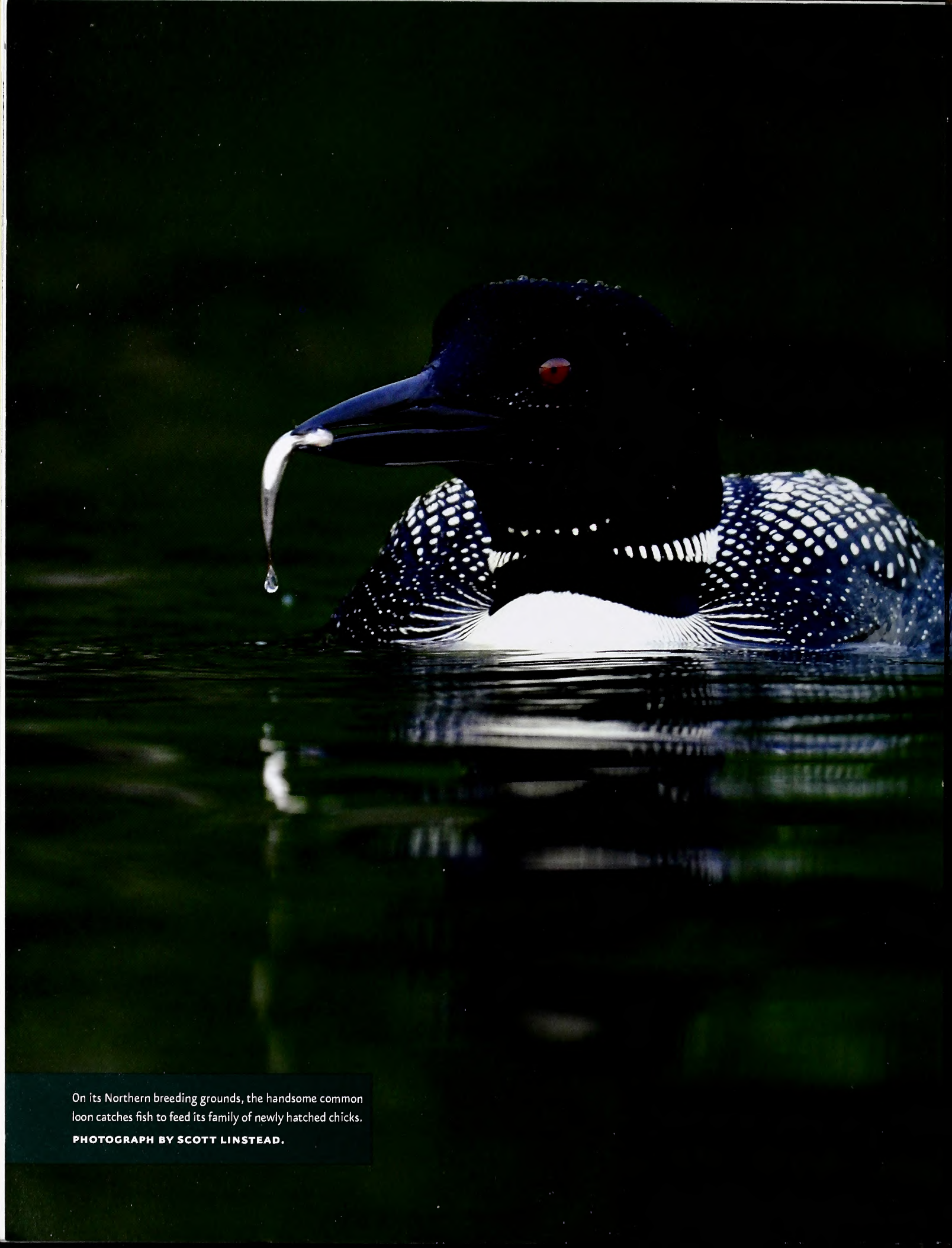
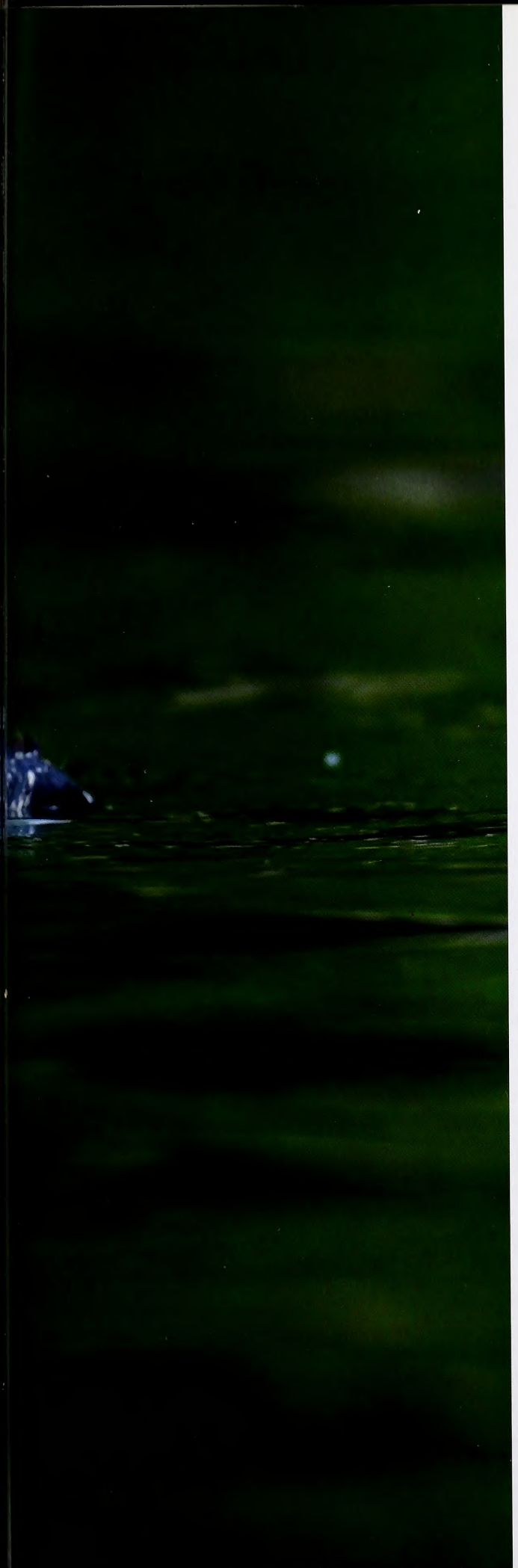




On its Northern breeding grounds, the handsome common loon catches fish to feed its family of newly hatched chicks.
PHOTOGRAPH BY SCOTT LINSTEAD.



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Cover: Bluefish are known for their feeding frenzies, when schools of young blues attack schools of baitfish such as these menhaden.
ILLUSTRATION BY CHRIS ARMSTRONG.

Wildlife in North Carolina is the official educational publication of the North Carolina Wildlife Resources Commission. It is dedicated to the sound conservation of North Carolina's wildlife and other interrelated natural resources and also to the environment we share with them.

EDITOR'S NOTE

"There's a lot a boy can learn from an old man." Thus begins Mark Joyner's story "Uncle Ivey and the Rabbit Gums" (page 14). Truer words were never written. That's why tales about an older gentleman schooling a young man in the ways of the wild are some of the most loved outdoor stories ever penned. The most obvious example, of course, is Robert Ruark's classic "The Old Man and the Boy." Ruark's storytelling puts you in the middle of the outdoor action with The Boy and tenderly examines the great love The Old Man has for his grandson.

ILLUSTRATION BY JIM BROWN

You don't have to go many chapters deep into "The Old Man and the Boy" before you realize that the times Ruark describes belong to a golden era that is long gone. Reading about those olden times conveys their wonder to a generation that will never get to experience them in the same way.

The good news is that there are still plenty of wonders in nature that are worth sharing with a child. Mark mentions some of them in his story, such as the joy of digging up worms for fishing — or just for the fun of digging up worms. The skill of live-trapping rabbits and other small animals no longer regularly helps put food on the table, but as Mark writes, it can come in handy when there is a varmint that needs catching.

Teaching a child outdoor skills — celestial navigation, fishing, fire starting, hunting, foraging, plant identification and so many others — has applications far beyond the woods. These skills teach self-reliance, resourcefulness, preparedness and confidence. They also build a lifelong appreciation for natural resources. You can talk to a child about being "green" all you want, but until they understand the importance of clean water (perhaps by searching for crayfish in a stream) and ecological diversity (maybe by participating in a local bird count), the message doesn't have a place to anchor in their psyche.

Of course, this type of sharing doesn't have to involve only old men and boys. It is equally important and relevant for people of all ages, sexes, colors and creeds. Share the outdoors with a child. If you don't know much about it, take a kid to Scouts, a class at a Wildlife Education Center, or just on walks in the woods. You'll learn a lot, and it will give you great stories to tell to the next generation.

Greg Jenkins

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Out-of-State Plates

I just viewed the current winners of the photo competition (Jan. 2010). All were wonderful photos and I am sure you had a hard time judging. However, I noticed that all of the winners were from North Carolina again, as were last year's winners.

So my suggestion is to change your rules and make it for N.C. residents only, as you seem reluctant to award a winning photo to nonresidents.

But that's OK, they are taxpayers and expect something in return for their tax dollars, unlike all the tourists who visit your state. I mean after all, tourists only pump in millions of dollars to your economy and expect no services in return, so why even bother to honor a single one who might take a good picture.

Jim Brown
Columbia, S.C.

Greg Jenkins: There were 8,802 entries submitted to the photo competition this year, of which 416 (5 percent) were taken by people living outside the state. We published 50 images in the photo competition section of the January issue—31 winners and 19 honorable mentions. Three of the honorable mention recipients were from outside North Carolina, and their pictures made up 6 percent of the photos in that section. Photos are judged without any identifying information that could reveal the photographer's name or hometown, or even the location of the picture. Judges don't know the identity of the winners until judging is complete. We have no intention of closing the competition to photographers from outside North Carolina.

On the inside front cover of the January issue is a photo of a barred owl hit by a car and rehabilitated at the Neuseway Nature Park in Kinston. You said the bird later had a leg amputated. I am quite disturbed at this. What kind of life is this for a bird that uses its feet to make a living, and will now spend its life standing on one leg?

Neuseway Nature Park, I'm certain, must have federal permits in order to have a permanent raptor. Quite a few years ago, the U.S. Fish and Wildlife stated that amputees were no longer allowed.

Douglass Swanson
Wildlife Rehabilitator
Beaufort

Bobby Cox, naturalist, Neuseway Nature Park: The owl came to us from a rehabilitator in Duplin County. When he got here, the rehabber informed us that he had been hit by a car and had been so long without medical treatment that the leg had to be amputated due to infection. This evaluation was done by a veterinarian. We did not rehab the bird, but we did take him in so he would not be put down. The state and federal governments say that we don't need a permit to keep an injured bird of prey as long as it is used for educational purposes and can be exhibited at least 12 times a year. Unfortunately, the owl has since died of age-related problems. When he was here he adapted well to people and feeding, and even learned how to lie down to rest.

Times A-Changing?

Our family has a longtime subscription to your magazine and we've noticed a definite trend away from all hunting and enforcement issues. In fact, it seems that your agency as a whole has shifted to biology and nature conservancy/education. While I applaud the trend to educate our youth and cultivate a broader audience, it appears the desire for more readers has diluted the intent of the magazine. Why is there such little coverage in January's issue about the upcoming public meeting for regulation changes, the just ended hunting season or the upcoming game seasons? There are many changes to cover, like the boating safety courses. What about a county by county profile of regulation as it relates to game issues? It seems there are predominately human interest stories rather than informative articles that could promote and educate as well. Why isn't there ever a mention of the dedicated game wardens who are out there keeping us safe? I suggest the editors consider a more balanced approach in the future, as many of us old-timers are scratching our heads wondering what happened.

Tracy Taylor
Granville County

Greg Jenkins: We always strive for a good balance of stories in the magazine, Tracy. We run quite a few hunting stories every year, and the boating safety education story you asked for is in this very issue. We have a number of enforcement stories planned, and will continue to look for ways to highlight the contributions of the dedicated wildlife enforcement officers who serve all North Carolinians.

En Fuego

Two comments regarding "Surviving Carolina" (Dec. 2009): To use a spark plug to start a fire, you need to ground the base of the plug to the motor housing to complete the circuit.

As for igniting gasoline, if oil were available, I would use a mixture of 1/3 gas and 2/3 oil. In college, I was on a forestry crew and this was the gas-diesel mix that we used in our drip torches. It burns nicely without flashing like gasoline.

Nat Wooding, Environmental Specialist
Dominion Environmental Biology
Richmond, Va.

write us

Letters should be sent via e-mail to **letters@ncwildlife.org** *or through regular mail to Letters, Wildlife in North Carolina magazine, 1712 Mail Service Center, Raleigh, NC 27699-1712. Please include your name, address and daytime phone number. Letters chosen for publication may be edited for clarity and length.*

A new boating education law for those under 26 requires compliance beginning May 1.

Written by Geoff Cantrell • Photographed by Melissa McGaw

MANDATE for Safety

There's something new on the water for this upcoming boating season, a law mandating an important and singular piece of safety equipment called instruction. Beginning May 1, boaters in North Carolina must meet the requirements of General Statute 75A-16.2, better known as the Boating Safety Education Law.

"Basically, anyone younger than 26 years old operating a vessel powered by a 10 horsepower or greater motor on a public waterway needs to have first successfully completed an approved boating safety education course or otherwise meet requirements before they take the helm," said Capt. Chris Huebner, the state boating safety coordinator with the N.C. Wildlife Resources Commission.

"All boaters must be able to exhibit that they are in compliance with the law upon the request of a law enforcement officer," he said. "That can be as easy as showing a driver license proving you are 26 years old or older, or holding a valid ID and a certification card."

The law will be administered by the Wildlife Commission, a longtime provider of free, nationally approved boating safety education courses and the regulatory agency given law enforcement jurisdiction on all public waterways in North Carolina.

The U.S. Coast Guard Auxiliary, U.S. Power Squadron and other organizations, including Internet providers, also offer approved courses that can include a fee. To be accepted, whether classroom instruction or online, the course must be approved by the National Association of State Boating Law Administrators, the oversight authority that works to develop public policy for recreational boating safety.

"Approved courses cover the rules of the road and operating basics, personal flotation devices, fire extinguishers and other safety equipment. You learn about navigational aids such as waterway markers and buoys, inland lighting rules, and how to handle emergencies," Capt. Huebner said. "Wildlife Commission instruction also covers state boating laws, registration and titling."

The need for safety instruction

The new law began with the recreational boating community becoming concerned about the safety of everyone on the water. Too many accidents and too many fatalities —North Carolina historically ranks in the top 10 in the nation for boating deaths— were being reported every year. Many were accidents that could have been prevented. So rank and file water sports enthusiasts across the state initiated grassroots efforts to put some operating standards in place to decrease accidents.

There are more than 300,000 registered boats in North Carolina. There are more than 5,000 square miles of inland streams, rivers, lakes and coastal waterways for them to navigate. The Wildlife Commission maintains 205 public boating access areas across the state. And in 2008, there were 157 reported boating accidents involving 216 vessels on those waterways, of which 18 included fatalities.

Safety advocates agreed with boaters that the best way to stop accidents was to start with setting some standards for basic boating education. Unlike driving a car or motorcycle, which require training and a license, operating a vessel in this state previously had no such requirements. Only 14- and 15-year-olds at the controls of a personal watercraft were required to have completed boating safety education as one of two conditions that allows them legal operation.

"I think too many boaters had seen too much," said Pete Deschenes, a resident of Lake Gaston, a scenic 20,000-acre impoundment shared by North Carolina and Virginia, lined with homes, marinas and docks that cater to a recreational boating lifestyle popular with anglers, vacationers and residents.

Deschenes is more than just an ardent proponent of the new law. He has been described as the spark behind the fire lighted under lawmakers to get legislation passed, though he quickly points out the efforts and involvement by a great many people and organizations.

He does state — for the record — that in 2004, two area groups, the Lake Gaston Water Safety Council and the Lake Gaston Association, set a common goal of bringing about mandatory boating education in Virginia and North Carolina.

Deschenes is an active member of both groups and quickly became immersed in those efforts. Their concerted efforts included a campaign calling upon other organizations, agencies and the marine industry to join together, getting a lobbyist and a determination not to stop until a law was in place.

"Phone calls, e-mails, letters and meetings were all daily activity in an attempt to coalesce support," Deschenes said of the simultaneous efforts in two states. "It was a cumulative effort and the timing was good."

Their first success came in 2007, when the Virginia General Assembly enacted a law to establish a boating safety education compliance requirement. Being phased in over the next several years, by 2016 all operators of vessels with a 10 horsepower or greater motor will be required to have a boating safety education course completion card on board in Virginia.

Then, the boating safety advocates' focus turned entirely to North Carolina.

"Early on, the idea got a cool reception or neutral stances," Deschenes said. "Everyone was for boating safety. Mandatory boating safety education was another thing. We realized we needed to gather more support to gain strength."

The North Carolina Safe Boating Alliance was created. Joined together were local marine commissions, water safety councils and state chapters of the U.S. Power Squadron.

One of those supporting groups was the Lake Norman Marine Commission, chartered for taking appropriate responsibility for public recreation and water safety, and as a part of those duties the organization encourages and promotes boating safety education.

The statutory requirements "are aimed at young people who are just starting out in recreational boating," said Sam Ausband, who was chairman of the Lake Norman Marine Commission during the time the law was drafted and passed. "Boating education gives them a good foundation to enjoy safe boating for a lifetime. We felt it was a good thing."

The Joint Select Committee on Mandatory Boating Safety Education was created by the General Assembly in 2008, co-chaired by state Sen. Edward Jones (Bertie, Chowan, Gates, Halifax, Hertford, Northampton, Perquimans counties) and state Rep. Michael H. Wray (Northampton, Vance, Warren counties). The committee was to determine the feasibility of implementing requirements, what the requirements should cover, fiscal impacts, appropriate exemptions and appropriate penalties, and make recommendations on possible legislation.

"My involvement in boater safety was to make sure that every person that operates a watercraft could do it safely," said Sen. Jones. "We must provide an educational process to make sure that everyone who operates a vessel upon the waters of North Carolina which is powered by a motor can operate the vessel safely. The only way we can assure that boaters can operate safely is through testing and to provide documentation such as a certificate of completion by a certified organization such as the N.C. Wildlife Resources Commission, U.S. Power Squadron and the U.S. Coast Guard and others who are concerned about boater safety on our lakes and waterways. This legislation is about reducing watercraft injuries and saving lives."

The joint select committee heard information and opinions on boating safety and the issue of boating safety education in a series of meetings.

"The experience of other states has shown that mandatory boater education requirements can make a difference," William H. Gossard, recreational boating safety coordinator with the National Transportation Safety Board, told the committee during a meeting in Raleigh. "The [National Transportation] Safety Board is pleased to support this initiative in North Carolina."

Upon the recommendation of the Joint Select Committee on Mandatory Boating Safety Education, a bill was introduced in the General Assembly and passed on June 30, 2009. Gov. Bev Perdue signed it into law on July 10, 2009.

"Because of the consistently high numbers of boating accidents and fatalities in North Carolina, it was imperative for the General Assembly to step in and enact this new law," said Rep. Wray. "Protecting people from avoidable accidents on the water is critical, and I would like to thank those people who have helped win approval of this law, particularly those early supporters who worked tirelessly for its passage. I would also like to express appreciation for the Wildlife Resources Commission and its continuing work to improve boating safety."

How the law works

As with any new regulation going into effect, Capt. Huebner said, there have been plenty of questions from the public.

"The most common question boils down to, 'Does this apply to me?' followed by when and where the next available course will be held.

"The basic elements are:

• Are you younger than 26?

• Are you at the helm of a vessel with 10 horsepower or greater motor on a public waterway?

"If you answer yes to both questions, then you need to have suceessfully completed a course or otherwise meet the requirements," Capt. Huebner said. "Finding the nearest Wildlife Commission course is as easy as going online to www.nc wildlife.org and elicking on the 'boating/waterways' icon or the 'edueation/workshops' ieon."

Other frequently asked questions include how the law affects nonresidents, commereial fishermen and someone who reeently purehased that first boat. "For out-of-state boaters who are visiting for 90 days or less, you must meet any applieable boating safety education requirements of your home state or nation to be in eompliance while you are in North Carolina," Capt. Huebner said. "Your vessel must meet all North Carolina safety equipment requirements."

For new boat owners, the eaptain said, "anyone who purehases a vessel and isn't already in eomplianee will receive a non-renewable temporary operator's eertifieate for operating that vessel. "It will allow operation for 90 days from date of purchase and gives you adequate time to come into compliance."

If you are considering a boat purchase, display of Wildlife Commission-issued dealer registration numbers will provide an exemption during the "test drive" or demonstration of a vessel.

Registered commercial fishermen or anyone operating a commereial fisherman's boat while under direet, onboard supervision of a eommereial fisherman will be eonsidered in eompliance. Anyone possessing a valid or expired lieense to operate a vessel issued to maritime personnel by the U.S. Coast Guard will be in eomplianee, as will anyone under direet onboard supervision of a person at least 18 who meets the requirements of the law.

The boating safety edueation law applies to personal watercraft, also known as jet skis, whieh already have age restrictions for operation. No one younger than 14 can operate a personal watercraft on publie waters in North Carolina, while no one younger than 16 ean operate a personal watereraft in North Carolina, with these exeeptions:

• A person at least 14, but younger than 16 ean operate a personal watereraft if riding with someone at least 18 and that person is in compliance with the boating safety education law.

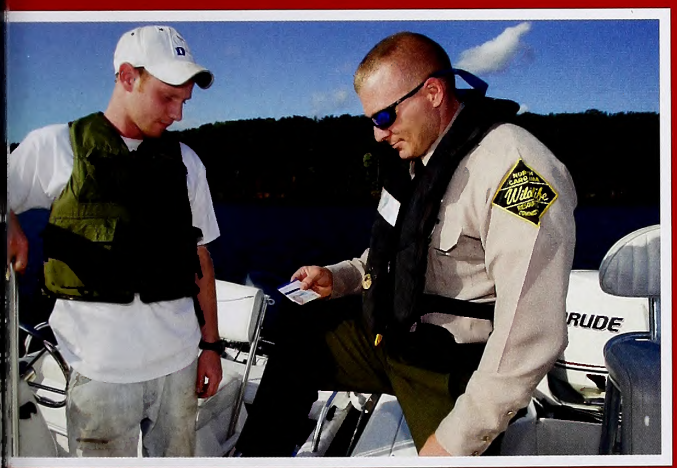
• The 14- to 16-year-old has suceessfully completed an approved boating safety education course and has proof of age and course completion with them.

A personal watercraft is considered a boat and anyone under 26 must meet the requirements of the boating safety edueation law.

Availability of Wildlife Commission courses, offered throughout the year, can be found online at www.newildlife.org/Apps/BoatingSafety/CourseSeareh.asp and elieking on eounty of residenee or neighboring counties. The Wildlife Commission will also conduet proetored equivalency exams at no eharge on a regular schedule aeross the state.

"The law goes into effeet on May 1, 2010, and approved eourses are being held now," Capt. Huebner said. "This law is designed to improve safety on the water, a 'know before you go' type of requirement that ean aetually enhance your boating enjoyment."

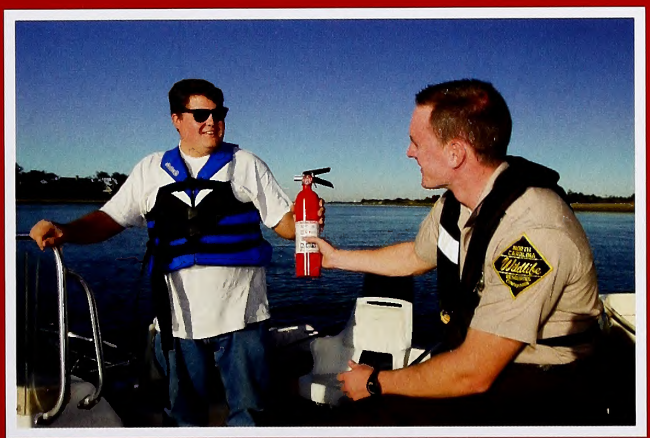
Geoff Cantrell is a public information officer with the N.C. Wildlife Resources Commission.



LEARN MORE

For more information on required boating safety education or how to enroll in a free course, visit www.ncwildlife.org or call (919) 707-0030. To read General Statute 75A-16.2 in its entirety, visit www.ncleg.net/Sessions/2009/Bills/Senate/PDF/S43v4.pdf.

Classroom instruction will be provided by a number of groups, including the Wildlife Commission. Operators under 26 must show a picture ID and present proof to Enforcement Officers that they have passed the course. Homeowners at Lake Gaston (far left, bottom) were instrumental in pushing the legislation. Owners of personal watercraft rental outfits such as Chris Mangum of Wrightsville Beach Jet Ski Rentals (immediate left, bottom) must provide basic instruction for renters.

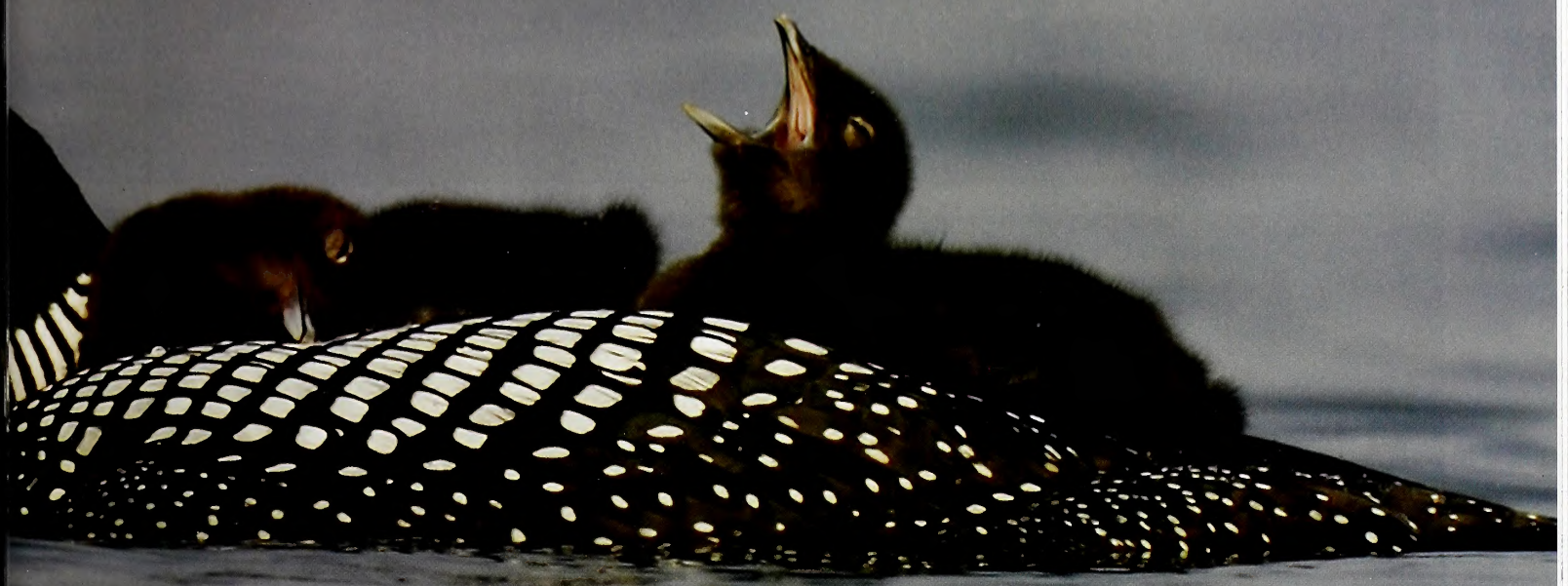


THE Loon's OTHER Life

WRITTEN AND PHOTOGRAPHED BY SCOTT LINSTEAD

QUIET AND DRAB-COLORED ON ITS WINTERING GROUNDS,

the common loon is colorful and distinctively musical in its Northern breeding areas.



Five a.m. found me motoring out over a misty lake in search of a family of common loons. The loons were easy to locate and extremely accommodating, paying little attention to the approaching boat. The feeding of the chicks was already under way when I arrived, so I was immediately under pressure to capture these fleeting moments. Keeping the camera low to provide a flattering, eye-level perspective, I captured a myriad of intimate moments, documenting the exchange of tiny minnows from parents to young.

The chicks climbed on and off the backs of the parents, sometimes eagerly stretching their necks to accept an offering of minnows, other times becoming sleepy and casting their heads back in tiny yawns. When the family wandered close to the shore, the most aesthetically pleasing images of the morning were obtained. The placid waters of the shoreline allowed for a mirrored image of the loons on the emerald green water reflecting the nearby tree line.

JIM ZIPP

The common loon is all dressed up for family life in its summer breeding plumage, but it sports an unremarkable look during its winter days down South.

I had traveled to a private lake in southern Quebec where, I was told, a family of common loons nested every summer. As it turned out, the arbitrarily chosen weekend could not have been better timed. Weeks later, while looking through the loon portfolios of others and discussing the experiences of other photographers, the real challenges of loon photography became apparent.

The critical element for capturing the tender family moments, including the endearing behavior of chicks riding on parents' backs, is indeed a matter of precise timing. Too soon, and the chicks are still eggs in the nest. Too late, and they have already grown up enough to eliminate the need to ride on their parents. Taking into account the varying tolerances of individual loons to human approach, the role of perfect lighting in capturing the deep blacks and bright whites of the birds, and a host of other seemingly unimportant details, the magic of my loon encounter became clear to me only later.

Common, yet remarkable

The common loon (*Gavia immer*), also known as the great Northern diver, is a rather large waterfowl measuring up to 36 inches long with a wingspan of around 58 inches. Particularly awkward on land due to large webbed feet set very far back on its body, the loon compensates for this handicap by swimming and diving with virtuosity. The thick, straight bill is ideal for grabbing its prey: pike, sunfish, perch, bass and trout in freshwater locations, and flounder, sea trout, rockfish and herring in saltwater habitat. There are exceptions to this diet, and loons have been known to eat crayfish and all manner of crustaceans. In breeding plumage, loons bear a variety of black-and-white patterns with a subtle iridescence in the blacks that will reveal hues of green and red when properly lit.

By the time the common loon begins to arrive on the Outer Banks of North Carolina, winter is well on its way and the distinctive markings of the bird have faded to its drab nonbreeding plumage. Interestingly, during southerly migration, the Chesapeake Bay Estuary is the last point at which loons in breeding plumage are seen in great numbers. In the early spring, on the way back north, the estuary is again the critical stopover, where the birds begin to regain their breeding apparel. The loon that we are liable to see overwintering in North Carolina is a dull, nondescript, grayish creature. Even the haunting calls for which the bird has earned its place in folklore are silenced during the winter months.

I feel like loon tonight

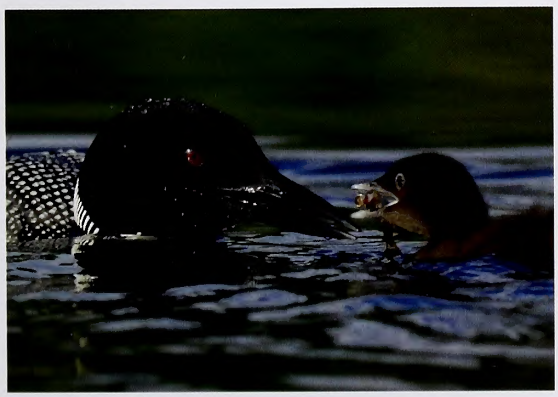
Despite the notion that everything that makes a loon a loon occurs in the northerly breeding climes, the bird has a rich history in North Carolina. Frank Moore, a lifelong resident of Harkers Island, speaks of a time in his teen years when the loon was hunted for sport and food. The loon was affectionately dubbed the "Harkers Island turkey" by the locals, who were not wasteful in their use of the bird. At times, the leg bone was hollowed out so a fishing line could be passed through. The irregular spinning motion that occurs when the bone is dragged through water made for a formidable fishing lure.

The feathers were often used as a kind of down to fill pillows. Moore describes how the cooking of loon breast and thigh meat was an all-day affair, producing a distinctively thick, dark gravy. Onions and cornmeal dumplings often complemented the meat. For many, the idea of consuming fish-eating waterfowl is daunting, to say the least. But when asked how loon tasted relative to duck, Moore simply said, "Different." Moore's award-winning carvings of loons and other waterfowl are on display at the Core Sound Waterfowl Museum on Harkers Island. Although loons are now protected, the original recipes still exist for posterity's sake in "Island Born and Bred," a recipe book that contains many Down East delicacies.

Mythology and modernity

Upon hearing the loon's variety of calls firsthand, it becomes obvious how the common loon earned its place in North American folklore. Tales originating from the Ojibwa tribe tell how a loon created the world. Among the many folk names for the bird, "call-up-a-storm" stems from the aboriginal belief in the loon's ability to do just that.

One of the more bizarre tales involves a "loon woman" whose infatuation with her own brother led her to pursue romantic relations with him. The brother, in disgust, left the lake, leaving behind a rotting log as a decoy in his place. In an attempt to flee along with the entire animal family, the brother took to the sky in a basket. When the loon woman returned to find everyone had left, she set the animal family lodge on fire in a fit of rage. A coyote tried to peer out of the basket to see the blaze below. This caused the basket to topple over, and all the animals fell to their doom. The loon woman made a necklace out of their blackened hearts, which can still be seen to this day as a black line around the loon's neck. This strange myth is interpreted by some as a cautionary tale of the taboo of incest.



In Canada, the loon has earned its place in everyday dialogue ever since a coin was issued in 1987 to replace the dollar bill. The coin featured the image of a loon on one side and soon after its release was unofficially dubbed the "loonie." The Canadian mint officially secured the rights to the name in 2006. The name caught on so well that it is now used in financial reports as a term comparable to the U.S. "greenback." When the Canadian $2 coin was issued in 1996, it was dubbed the "toonie," despite the fact that the coin displayed an image of a polar bear. The loon has clearly earned a reputation as the quintessential symbol of the North.

Photographic pursuit

Having arrived at the lake late in the evening, I had no time on the first day to get out on the water. My introduction to the loons was hearing the couple call out to each other after dark. The distinct call of this aquatic bird has to be heard to be believed. On a perfectly silent and still night, the call was nothing short of haunting. The melancholy, two-toned wail, reminiscent of the modal-falsetto style of vocalists such as Sarah McLachlan, is used in the evening so a loon couple can keep in contact with one another. I have heard the calls of many avian species over the years, but experiencing the call of the common loon breaking the silence of a summer night was, to say the least, unique. It was almost like an affirmation from the loons that they were indeed close by, as well as a promise of a rare photographic experience to come.

In the weeks following my first experience, I returned to the loon family a number of times. The chicks were growing up quickly and gaining body mass to the point that even one chick riding on a parent's back caused the elder loon to sink comically. I valued the opportunity to round out my loon portfolio with different behaviors and to document the growth of the chicks, but the trophy images of the collection are unquestionably those that were obtained on that first morning.

As the summer moved into early fall, the lake was occupied no longer by a single loon family but by a few dozen loons gathering in sufficiently large numbers to make their migratory journey to North Carolina and other Southern locales.

I was sad to see the loons moving on for the season but encouraged by the fact that mating couples are very likely to return to the same breeding ground year after year. I was also grateful to have the special opportunity to observe the subtle and intimate interaction of a new family. ◆

Scott Linstead is a wildlife photographer and writer living in Maple Grove, Quebec. He is an occasional contributor to WINC.

Both loon parents build the nest and incubate one to three eggs. After hatching, they spend most of their time feeding the chicks and teaching them skills such as diving.

PHOTOS BY CHERYL ERTELT

Loon and sea

Hunting loons has been illegal in North Carolina for more than 90 years, but dearly held traditions die hard and slow on Harkers Island. Each May, the Core Sound Decoy Carvers Guild sponsors Loon Day, a competition that makers enter by donating their decoys to the guild, which then auctions the decoys to raise funds.

Initially, the competition was for loon decoys only, but it has expanded to include puddle ducks. Judging takes place in the water at the Harkers Island Bridge area, with judges making their evaluations from shore. Decoys are hidden before judging so they cannot be prejudged at a closer distance. Cash prizes are awarded for the top four decoys, and afterward all of the competition entries are auctioned.

In another nod to Down East tradition, the guild's annual Core Sound Decoy Festival features the World Champion Loon Calling competition. The festival takes place in early December each year. Call (252) 838-8818 or visit www.decoyguild.com for details.

Learn more

Visit the Cornell Lab of Ornithology at www.allaboutbirds.org to learn more about the common loon and to hear its vocalizations.

To read more about environmental threats to the common loon, see "Nothing to Laugh About," Dec. 2001 *WINC*.

Union

UNCLE IVEY AND THE RABBIT GUMS

WRITTEN BY
MARK JOYNER

ILLUSTRATED BY JIM BROWN

THE ONCE-POPULAR PRACTICE OF SETTING RABBIT BOXES HAS WANED, BUT THE LESSONS AND SKILLS LEARNED LINGER THROUGH THE YEARS.

THERE'S A LOT A BOY CAN LEARN FROM AN OLD MAN. I suppose that's what my dad was thinking when he used to send me fishing with a white-haired gentleman in our church who was known to one and all as Uncle Ivey. It's not that my dad didn't take me himself when he could, but it seemed that he, a Baptist pastor, was often tending to a larger flock than just our immediate family. Uncle Ivey couldn't get around well anymore, and here I was, a 10-year-old kid who couldn't get enough of fishing, so the match was made.

Not that I minded, as I thought a lot of Uncle Ivey, even if he did have his ways. I had no idea how old he was, except that in those days little country churches like ours awarded a lapel pin each year for perfect attendance. His pins were so numerous they hung in long chains that marked both his faithfulness and his years. That and showing up at church socials with his ukulele were enough to win my respect.

On the appointed days for fishing, the procedure was always the same: We'd pick Uncle Ivey up at the little trailer he lived in and wait while he gathered up his things in an onion sack. Into it went all sorts of odds and ends, such as pieces of twine, fishing line and Band-Aid cans with hooks and sinkers. By comparison, I must have represented the cutting edge of technology with my plastic tackle box and a baitcaster I'd bought with money earned mowing yards.

It was my job to dig up the day's fishing worms, grubbing around with a hoe at a plaee out baek where he pitehed his eoffee grounds and table seraps. Again, I'm not eomplaining; any kid ean tell you that after a while it's almost as mueh fun digging in the dirt and finding big fat worms as it is fishing.

Angling his eane poles out the ear windows, we'd head out to the nearby Catawba River. Those were the days when Lake Norman was just beginning to fill, whieh meant the river was being flooded and loeal feeder ereeks were transformed almost overnight into deep fishing holes. Catfish, erappies and bass were all seeking out these new spawning grounds, and the fishing was good. Dad would often set us out somewhere to fish all day and piek us up later.

Oddly enough, it's not just the fishing that I look baek on from those lazy days. Uncle Ivey liked to talk and show me things, and I guess I was a good student. I remember even now how to make a passable trombone sound by blowing through the stalk of a pokeweed plant, and how to roll a worm in an anthill to eoat it so it won't be so slippery when you're trying to thread it onto a hook. And that the proper way to rob honey from a swarm of bees in a hollow tree is to build a fire and smoke them out (whieh fortunately we didn't follow up on). Not exaetly the wisdom of the ages, but still valuable hands-on knowledge that deserved to be passed on to the next generation.

Summer became fall, which gave way to winter, and the fishing was no more. Instead, talk turned to wild game, hunting and rabbit gums, whieh is what old-timers ealled wooden boxes built to trap rabbits. The name eame from an earlier time when they were aetually fashioned from short lengths of gum trees hollowed out by wood-rotting fungus. In a similar fashion, larger seetions were utilized as bee gums as well as storage eontainers.

To those not familiar with this pieee of Amerieana, let me point out that there was a time in our rural past when boys routinely set out rabbit boxes and proudly helped put food on the

table. Rabbits were more plentiful in those days than now and were somewhat of a nuisance to anyone who had a garden, which was just about everybody.

Building a rabbit box was relatively easy, whether using a gum log or scraps of wood. The design itself was simple but effective, basically a box just big enough for a rabbit to crawl into in search of an apple or other bait placed far in the back. The door was suspended above the opening and connected to a stick in front of the bait that worked like a trigger; the slightest bump against this trigger allowed the door to fall shut.

Uncle Ivey had several of these boxes, made of weathered lumber instead of gum trees, which he was no longer able to work with. When I expressed an interest in them, he was only too happy to pass them along to me with plenty of advice on how to bait, set and tend them. I became the proud owner of three rabbit boxes and eagerly joined the ranks of those famed mountain men and trappers who pioneered this great country.

Of course, anyone can set a rabbit box out and just hope for the best. The trick is to place it where it's likely to actually catch something. That requires carefully scouting out honeysuckle thickets, brush piles and overgrown fields in search of rabbit trails. Rabbits are creatures of habit, and their comings and goings create paths and tunnels through these areas. Locating their runs is half the battle and at least indicates they're in the vicinity. The savvy trapper also knows not to tread on these pathways; the cottontail is suspicious by nature and quick to detect the telltale scent of humans.

Fortunately there were several promising-looking spots in the woods and fields behind our house. At the best of these locations I carefully positioned the boxes at right angles to the trails as advised, not actually on them. An apple was placed in each box, after I first scrubbed it on the wood around the door and sprinkled a few pieces on the trail. I set the triggers and backed away.

I'm sure I dreamed about rabbits that night, and what I would find the next morning. Waking up early, I dressed and anxiously set out into the icy morning air to see what I might have. The first box had nothing, and I could see from a distance that the door was still suspended. The second was empty also, as was the third. Hardly what I expected, although I'd been warned that it might take a few days for the human smell to wear off the boxes. I avoided touching the boxes and didn't even approach any closer than I had to.

The next day was the same, but on the third day I tried to stay calm when I saw the door was down on the first trap. I tilted the box up on its end and slid the door open just enough to spy the hind legs and feet of a rabbit. I knew the correct procedure was to pull it out by its legs, and dispatch it with a blow right behind its head. I wanted to get a good look at my first catch though, and I was afraid it would get away, so instead I ran home with the box cradled tightly in my arms.

We had a small cellar under our house, and this seemed like a good place to turn the rabbit loose. I think at that point I was considering making a pet of it, depending on how we got along. When I was finally able to shake it out of the box, it ricocheted wildly off a couple of walls and then disappeared under our house. I never saw it again, and for all I know its bones are there to this very day.

I was embarrassed about that little incident, at least until my uncle confided to me that he had done something similar when he was young. He had also trapped a rabbit and happened to be carrying a new shotgun he was eager to try out. It didn't seem sporting to shoot a rabbit in hand, so he took out a short piece of rope and tethered the rabbit to a stump. He then stepped off what he deemed was an appropriate distance to make his shot, aimed and let loose at the rabbit's head. His shot neatly cut the rope in two, and the rabbit ran away.

There would be other rabbits for me, along with the occasional possum and a stray cat or two. Older fellows claimed a rabbit wouldn't go into a box after a possum had been in it, and the only fix was to build a fire and smoke the box out. I can't say that's true, but I do know for a fact that you don't want to pull an angry tomcat out by its hind legs, or expect it to be grateful for its release. It also turns out that a major advantage of a live trap is that you don't have to explain to the neighbors that you killed their cat.

OF COURSE, ANYONE CAN SET A RABBIT BOX OUT AND JUST HOPE FOR THE BEST. THE TRICK IS TO PLACE IT WHERE IT'S LIKELY TO ACTUALLY CATCH SOMETHING.

A RABBIT TYPICALLY LIVES NOT MUCH LONGER THAN A YEAR BUT DURING THAT TIME CAN PRODUCE ABOUT THREE LITTERS, EACH WITH TWO TO THREE YOUNG.

I built a few more boxes that winter, so that eventually I had half a dozen or so, all within a mile from our house. It made for a long morning walk but sure increased the chances of a catch. From then on rabbits made it all the way home to my mom's kitchen, where she fried them up with gravy made from the drippings and served them with homemade biscuits. She usually made extra so we could take some to Uncle Ivey, which I was especially proud to do.

The whole family benefited from my rabbits, as my older brother Ron received extra credit in school for bringing in a complete set of rabbit organs in alcohol-filled jars. Who knew that he would turn out to be a doctor? As for me, there's no doubt I wasted a lot of time stretching out rabbit hides on planks for no particular purpose. In my defense, those were the days when coonskin hats were enjoying a heyday, thanks to the enormous popularity of Davy Crockett and Daniel Boone on television. No one I knew thought it was curious that Fess Parker somehow portrayed both these frontiersmen.

Somewhere between those times and now America changed, and the days of boys venturing out on frosty mornings to check their traps came and went. Small family farms and rural areas gave way to developments, towns and neighborhoods where such activities would be frowned upon. Though we no longer look to rabbit boxes to feed the family, the basic trap design can still be put to effective use, and sometimes in unusual ways.

I found this out when I was a young man working in a cabinet shop, and the owner's cat decided to have her litter out in his horse barn. We thought it best to leave her alone and check on her each day. Unfortunately, a couple of the kittens were killed that night in a most gruesome way. We brought the survivors inside, but I was certainly curious as to what kind of diabolical creature was roaming the grounds. I suggested we build a scaled-down version of a rabbit box, which we set that evening in the barn.

The next morning I found that whatever it was had been caught but during the night had chewed through the plywood door and escaped. I rebuilt the door with a plank of solid black walnut left over from a project we were working on and set the trap again. That did the trick, and when I checked early the following morning, something was definitely inside the box and was not happy.

I was understandably cautious about opening the door, so we hit upon the idea of carrying the box and its contents to the middle of an open field for the unveiling. Whether it was for protection or sport, we brought along a couple of my friend's dogs that we thought might learn something from the experience. The dogs were of course nearly crazed by the time we reached the field, and when we very carefully raised the trap's door, out rushed a huge rat. Its sudden appearance caught the dogs off guard and gave it a small head start, but it didn't get far before it disappeared in a flurry of teeth and fur. For the record, let there never again be a question about the courage and heart of miniature dachshunds.

Over the years I've also found a rabbit box baited with peanuts to be highly effective in dealing with nuisance squirrels. As anyone who's suffered through the indignity of having bird feeders destroyed can tell you, there aren't a lot of good options for dealing with squirrels in residential areas.

A friend of mine who in desperation resorted to a BB gun received a phone call from his next-door neighbor about a picture window with a suspicious fracture. In case you're wondering, the squirrel was unharmed.

Ironically, while squirrels and game species such as deer and wild turkey are today enjoying population booms, others are not faring as well. Rabbit populations are down from historic levels in many parts of the state, largely due to loss of adequate habitat offering food and cover. Without good

hiding places, rabbits can be easy prey for foxes, bobcats, hawks and owls, as well as dogs and cats both feral and tame.

The good news is that with proper land management practices, rabbit and quail populations rebound quickly. A rabbit typically lives not much longer than a year but during that time can produce about three litters, each with two to three young. That means each pair could produce six or more young in a year's time, allowing populations to build quickly.

Just for old time's sake, this past winter my son Graham and I decided to build a couple of rabbit boxes to see if they still worked. We made a few modifications to the original design, such as adding wire mesh to the back of the box, allowing the rabbit to see there was no predator lurking inside. The result: a fine cottontail on the fourth morning. And yes, the fried rabbit recipe was just as good as I remembered it, although it's never the same as your mom's.

Sized to fit and with the appropriate bait, and with strict attention to game laws, the box trap could probably be utilized to humanely capture nearly any animal, from stray dogs running through the yard to raccoons rummaging through the trash. It's an outdoor skill worth developing, if for no other reason than the challenge of outwitting a wild creature.

Besides, you never know when you could find yourself stranded in the wilderness, and rabbit could start looking pretty tasty. A hastily scrapped-together box trap could be a lifesaver in such circumstances. If and when that occurs, I feel sure Uncle Ivey would be quite pleased to know he could be of help. ⬘

Mark Joyner is the executive vice president of the N.C. Aquarium Society and a regular contributor to Wildlife in North Carolina.

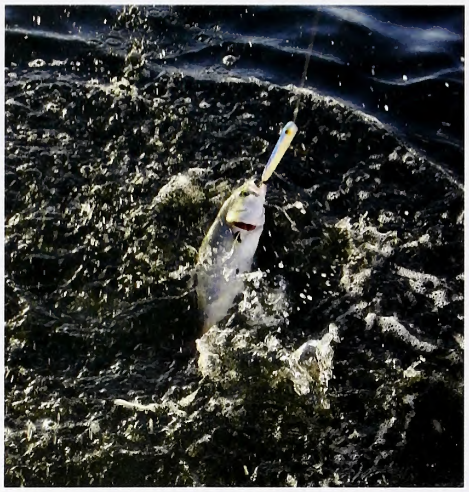
BRIGHTER DAYS FOR BLUEFISH

With the fish's stock rebuilt, anglers are no longer singing the blues for one of the sea's toughest fighters.

WRITTEN BY MIKE MARSH • PHOTOGRAPHED BY JOE MALAT • ILLUSTRATION BY CHRIS ARMSTRONG

Ned Connelly watched a swarm of seabirds circling above water that churned like the inside of a washing machine as he navigated his small boat along a sandbar at Carolina Beach Inlet. The inlet itself caused the water to foam, as wave after wave rolled up over the sandbars on the north and south sides. The sandbars and waves can be treacherous when a boat nears the shallows, but the ripping current of falling tide held something else that was chewing up the water. It was something that held the attention of the seabirds watching greedily but with wariness from overhead.

Suddenly, a gull dived to the water. But the bird only pecked a small menhaden. Despite its pincerslike beak, the gull could not maintain a grip on the struggling silver fish. Dropping it back to the water, the bird did not land on the surface to recapture it, as gulls usually do. Other gulls did not even fight over the apparently easy meal. Instead, the luckless bird picked up its feet like a wader tipping his toe into a springtime swimming pool to test the water temperature.



With a mouthful of sharp teeth, a bluefish can make quick work of monofilament line, thus making wire leaders an essential part of anglers' tackle.

It's as if the gull knew what the menhaden had been fleeing below the surface and was smart enough to protect its fragile webbed feet. Whether the bird was hatched with the instinct or had somehow learned that staying airborne was the smart thing to do, it was certainly the right choice. The second the injured baitfish hit the water, it was chopped up and swallowed by a piscatorial meat grinder that could have done the same thing to a gull's foot.

Connelly shuddered at the thought as he shut off his motor. Announcing that he had found the right fishing spot, he dropped his anchor and picked up his spinning rod.

"I'd hate to be a menhaden in that school today," he said. "If you tried to swim on the surface, a gull might eat you. But if you stayed below the surface, a bluefish is going to eat you. The faster you reel a lure, the better a bluefish likes to chase and catch it. Once he thinks you're dinner, there's no getting away. A menhaden doesn't stand a chance in a race against a bluefish."

Connelly used a time-tested lure — a natural bucktail jig tipped with a strip of fish — to get the attention of the bluefish. He made a cast and retrieved the jig by lifting the rod tip in a hopping motion, picking it up each time the lure bumped the sand. It took all of three bumps for a bluefish to strike.

Connelly set the hook, and the drag screeched. The fish leaped at the strike and made a long run, using the current to increase its speed. It leaped from the water several times, its teeth chattering against the lure like nightmarish castanets. Connelly skillfully played the fish with a light drag setting until it eventually tired. He netted the fish to land it and set the net with the fish inside it on the deck. The net corralled the fish as Connelly grabbed the lure with long-nosed pliers to free it. Still the fish fought, stripping the outer plastic covering from a coated wire leader and biting through a few strands of the monofilament net. But the long reach of the pliers protected Connelly's fingers.

"A finger doesn't stand any more of a chance against a bluefish than a menhaden does," he said. "A bluefish can bite through bones, skin, meat, fingernails and fish scales. You can use braided line or monofilament line to catch a bluefish. But one thing's for sure: If you don't use a wire leader, the bluefish will make off with whatever he has in his mouth, whether it's a lure or a baited hook."

Connelly also used some topwater lures to catch a few bluefish, casting hard plastic, floating poppers into the melee. As the fishing tapered off, he dipped a net into the live well to scoop up a menhaden. He tied on a Carolina rig, consisting of an egg sinker sliding on the line above a swivel with the swivel tied to a coated wire leader dangling a single hook.

"You can chum them up or find them already feeding and catch them with live baits or cut baits or by casting or trolling artificial lures," he said. "You can catch them from an ocean pier, from the beach or from a boat. A bluefish bites aggressively and has incredible speed and endurance. A bluefish will even jump and put on a show when you hook it on light tackle. Some people don't like to eat them, but to me, a fresh bluefish is one of the best-tasting fish in the ocean. You can grill, fry, broil or bake it and it's wonderful to eat. I can't think of a better game fish than a bluefish. I've had many fishing trips for other species such as red drum, Spanish mackerel, speckled trout and flounder that would have been busts if I hadn't run across a school of bluefish in a biting mood to save the day."

It wasn't so long ago that recreational fishermen like Connelly were singing the blues about bluefish. The fish have had a long-standing, almost mythical tendency to swarm the entire North Carolina coast one year then all but disappear the following year. Connelly said he has fished for bluefish for more than two decades, and that the cyclic nature of the fish seems to be subsiding in favor of an increasing abundance. He said the biggest fish he sees are usually along the southern coast through May and into early June. Though the big "choppers," which can weigh more than 10 pounds, appear to have their biggest runs in spring, he also said he might run into a school of bluefish weighing between half a pound and 4 pounds at any time of the year.

Beth Burns, an N.C. Division of Marine Fisheries biologist with a specialty in several saltwater species including bluefish, confirmed that Connelly's observation that bluefish numbers have increased is no speculation. The resurgence of the population and the resulting consistent fishing are indeed facts.

"Bluefish were recovered, achieving the population biomass we wanted to see in 2007 and 2008," Burns said. "Now, there are more bluefish for everybody, so every state along

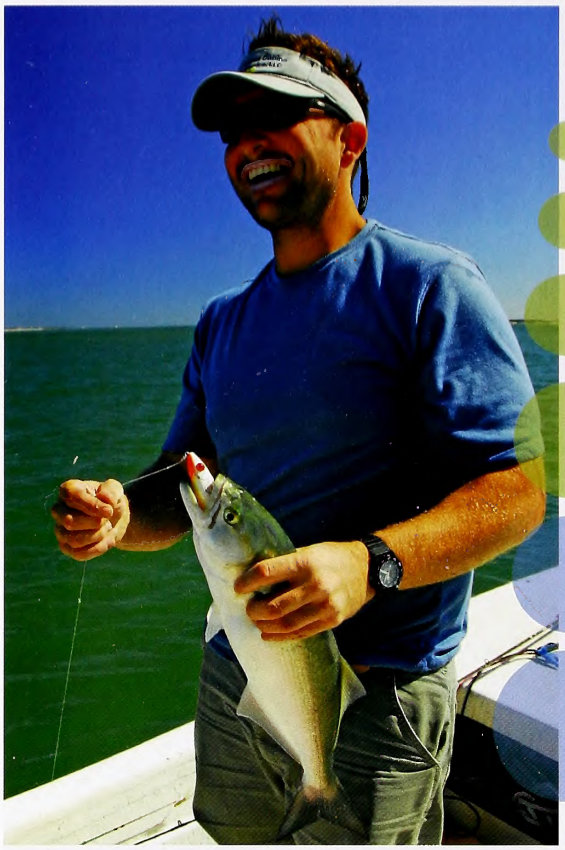
the Atlantic coastline is seeing the same thing. Bluefish are hanging around well into summer and fall, even into the winter. North Carolina is the only state with a recreational bag limit on large fish. Our recreational limit is a maximum of 15 fish, with only five fish greater than 24 inches."

All states within the Bluefish Management Plan area—Maine, New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Delaware, Maryland, Virginia, North Carolina, South Carolina, Georgia and Florida—were required to adhere to the plan, which was approved by the Mid-Atlantic Fishery Management Council and the Atlantic States Marine Fisheries Commission (ASMFC) and put in place in 1990. The plan set a maximum bag limit of 10 fish in 1990, which increased to a 15-fish bag limit in the years since 2001. One state (Maine) adopted a limit of three fish, and some states set minimum sizes. Most states adopted either a 10-fish or 15-fish bag limit to meet their recreational harvest targets established by the federal Bluefish Management Plan.

Although other states may follow its lead, North Carolina was the only state to initially add protection for large bluefish. It wasn't long ago that even one 24-inch bluefish was a nearly impossible catch, let alone five big choppers of that size. Historically, the total coastwide landings for all states have been divided at 83 percent recreational and 17 percent commercial, and the original Bluefish Management Plan attempted to achieve those same ratios. Despite all of the plan's objectives for conserving bluefish, in 1997 bluefish were declared overfished. An amendment to the federal plan required the stock to be restored as soon as possible, which was deemed feasible by Jan. 1, 2010.

Over the years, the recreational landings had declined both as a total catch and as a proportion of the total combined recreational and commercial catch. Eventually commercial fishermen requested and were granted all or part of the recreational quota that hook-and-line anglers were leaving in the ocean. But now that arrangement is no longer an option because recreational anglers are retaining at or near their historical percentage of the total bluefish harvest. The commercial quota will likely continue to be

A BLUEFISH BITES AGGRESSIVELY AND HAS INCREDIBLE SPEED AND ENDURANCE. A BLUEFISH WILL EVEN JUMP AND PUT ON A SHOW WHEN YOU HOOK IT ON LIGHT TACKLE.



A BLUEFISH IS A GREAT FISH. IN A LOT OF WAYS, A BLUEFISH IS THE PERFECT FISH. THEY'RE PLENTIFUL AND AGGRESSIVE, JUMP HIGH AND FIGHT HARD.

Fishing for bluefish can be good on either land or sea. Jeff McBane (left) landed this nice bluefish from a boat, while Marine Fisheries Commission chairman Mac Currin hooked two from the surf.

BLUEFISH BAIT

FINGER MULLET

FINGER MULLET FILLETED

MULLET AND BUCKTAIL

reduced until it stabilizes at the historical 17 percent of the total catch.

"The federal bluefish plan amendment required that we recover the bluefish population to the maximum sustainable yield," Burns said. "Allowable commercial landings were based on landing data from the early 1980s. Coastwide commercial bluefish landings decreased from 16.5 million pounds in 1981 to 7.3 million pounds in 1989 and held steady at 7 to 8 million pounds since 2000."

Coastwide recreational catches showed the same downward trend, decreasing from 95.3 million pounds in 1981 to 30.6 million pounds by 1990. By 1999, recreational landings were the lowest in 25 years, with just 8.3 million pounds of bluefish landed.

"We were really worried about bluefish when the plan was first implemented and didn't appear to be working," Burns said. "But the amended plan is working, so recreational anglers should be very happy now."

Commercial fishermen may not be as happy, now that recreational anglers are starting to catch their historic share of bluefish. Beginning in 1999, recreational landings were showing a steady increase. Then a very large recreational catch increase of 25 percent occurred in 2007 when compared to 2006. The increase was documented to be the result of an increase in recreational fishing effort.

Bluefish abundance peaked in 1982 at 163 million fish, declined to 58 million fish in the 1990s and has since increased to more than 100 million fish. Current recommendations are for a commercial quota of 7,678,494 pounds, a recreational harvest limit of 21,605,734 pounds, and unchanged possession limits.

In North Carolina, the Division of Marine Fisheries tracks recreational and commercial bluefish harvests to gauge compliance with the federal Bluefish Management Plan and the state's management plan. In

microcosm, the state's commercial and recreational harvests provide a slice of what fishery managers and recreational and commercial fishermen are seeing on a coastwide basis.

North Carolina's recreational anglers have been catching steady numbers of bluefish for the past several seasons. The recreational landings were 1,061,208 pounds in 2004; 1,246,512 pounds in 2005; 1,119,792 pounds in 2006; 1,315,512 in 2007 and 1,282,692 pounds in 2008. During the 1990s, North Carolina recreational anglers experienced many years when landings were well below half those amounts, with the worst year in 1996, when only 289,619 pounds of bluefish were landed.

Commercial landings have been falling in recent years, due to harvest restrictions to meet the commercial quota. The commercial landings were 3,762,950 pounds in 2004; 2,837,612 pounds in 2005; 2,791,157 pounds in 2006; 2,332,118 pounds in 2007 and 1,930,391 pounds in 2008. The peak commercial harvest year was 1983, when North Carolina commercial landings totaled 6,746,956 pounds.

No matter how you slice and dice the figures, fishermen are landing lots of bluefish, and the population appears to most fishery managers to be on target with sustainable harvest levels based on historic populations and harvests. But not everyone is in agreement that all aspects of the fishery are entirely recovered.

Dick Brame is the Atlantic states fisheries director for the Coastal Conservation Association (CCA) and lives in Wilmington. In his capacity with CCA, he attends all of the ASMFC meetings. He is still keeping a wary eye on bluefish.

"The bluefish plan is a federal fishery management plan that we watch, along with all of the other species plans," Brame said. "I attend all fishery management board meetings and technical stock assessment meetings. For years recreational anglers weren't catching many bluefish. But the commercial fishermen were, until it became a 50-percent recreational, 50-percent commercial fishery.

We stated that we felt the fishery would fully recover more quickly if the recreational bluefish that weren't caught were banked rather than being allocated to commercial fishermen. But at least the total quota for recreational and commercial fishermen was not allowed to be exceeded, and now the recreational and commercial allocations will be returned to their historic ratios."

Brame said he doesn't believe that the bluefish population has fully recovered. He said that though the bluefish biomass has grown above an established threshold for the stock to be sustained, he doesn't agree that the historical age structure has been achieved.

"Bluefish live for 15 to 20 years," he said. "That means we won't really have complete recovery until we see a higher percentage of older age classes of bluefish. But we are no longer catching bluefish at an unsustainable rate, which we hope will allow more fish to reach those older ages."

Brame said the picture might also be more complicated than the single-minded goal of the Bluefish Management Plan. He said old fishermen's tales about bluefish numbers increasing as striped bass numbers decreased are the stuff of legends along the North Carolina Outer Banks.

"In the early 1960s and 1970s, we caught striped bass along the Outer Banks, but no bluefish," he said. "Then the stripers disappeared and we caught bluefish again. Now, anglers are catching both species. You have to wonder if it is connected to baitfish, now that nobody is fishing for menhaden in North Carolina waters after the closing of Beaufort Fisheries [a menhaden reduction operation that once had plants in Beaufort and Southport]. Both game fish forage on menhaden.

"I'm glad we're seeing brighter days for bluefish," Brame said. "A bluefish is a great fish. In a lot of ways, a bluefish is the perfect fish. They're plentiful and aggressive, jump high and fight hard.

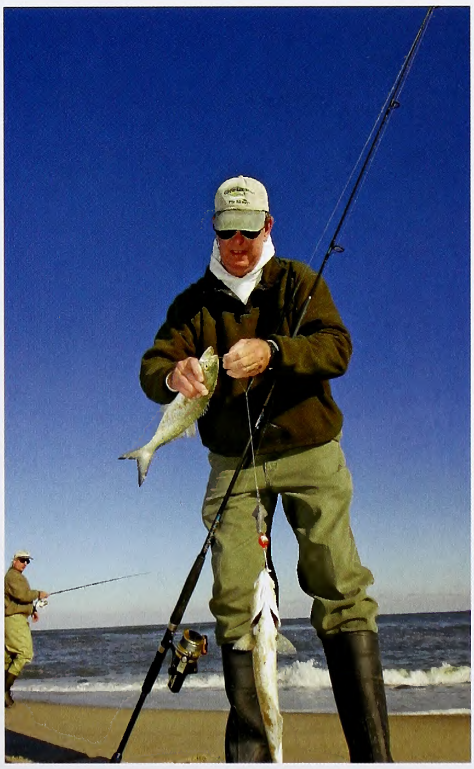
"The most fun fishing I've ever done was catching 10- to 18-pound bluefish on topwater lures in the Chester River in Maryland. That was way back in 1984. Now, thanks to better management, I may get the chance to experience that kind of fishing again." ◆

Mike Marsh is a freelance writer living in Wilmington and a frequent contributor to Wildlife in North Carolina.

BLUEFISH BAIT

MULLET FILLETED

MENHADEN



A Wild & Woolly BATTLE

In recent years, efforts to save Fraser firs, Carolina hemlocks and Eastern hemlocks from woolly adelgids have expanded into new partnerships and tactics. There is promise, but the work continues.

written by Rosemary Hallberg photographed by Bill Lea

Clusters of jagged, bare trees line the road to Mount Mitchell's summit. Once tall, thick forests of Fraser fir, these lichen-covered skeletons now stand naked against a dense population of younger fir and mountain ash. The Frasers were the first of three tree species in the Appalachian Mountains to experience a rapid die-off as a result of one of two tiny exotic insects—the woolly adelgids. The balsam woolly adelgid (*Adelges piceae*) caused the decimation of Fraser firs in the 1950s and '60s. Its relative, the hemlock woolly adelgid (*Adelges tsugae*), is claiming the lives of Eastern and Carolina hemlocks in the Smoky Mountains. This is the story of the war against both insects.

The story begins at Mount Mitchell, site of the first reported occurrence of the balsam woolly adelgid in North Carolina. Standing on the summit with entomologist Fred Hain from N.C. State University, I see a former battle scene, mingled with a regeneration of Frasers. In the wild, the balsam woolly adelgid prefers mature trees, so many of the living trees here are either younger or have developed a way to resist the effects of the pest's feeding.

Hain is interested in the older, living Frasers—those that stood through the heavy adelgid infestations of the 1950s and '60s and survived. He believes that Fraser firs and hemlocks with "host resistance" to the adelgid will boost the success of chemical and biocontrol management efforts. In 2006 he created the Partnership for Threatened Forests, a unique interagency partnership including university researchers, the U.S. Forest Service and a nonprofit forest tree conservation program called Camcore. Their goal: to prevent more Fraser fir and hemlock forests from dying.

Near Mount Mitchell's summit, Hain points at a fallen Fraser fir with a brownish red ring circling the outer xylem. "This ring is called 'rotholz,'" he explains. "It's the way the Fraser fir reacts to the balsam woolly adelgid's sheath, the chemical surrounding the stylet that the insect injects into the bark. The tree is attempting to heal a perceived wound that seems much deeper than it really is. It produces a chemical around the wound site, which becomes impermeable tissue. If there's enough of it on the tree, it kills the tree."

A drive to Carolina Hemlock Campground tells the next part of the story, that

of the Eastern (*Tsuga canadensis*) and Carolina (*Tsuga caroliniana*) hemlocks. On the undersides of the branches, where the needles join, are lines of tiny white cottony masses. The hemlock woolly adelgid was first reported in North Carolina in the late 1990s, at Hanging Rock State Park in Danbury. The hemlock woolly adelgid feeds on the trees' storage cells, hindering fluid translocation and causing massive needle loss and rapid death. Both Eastern and Carolina hemlocks are susceptible to the pest, but Eastern hemlock seems more so. Hain says that Carolina hemlock is genetically closer to the adelgid-resistant Asian hemlock than it is to Eastern hemlock, so some Carolina hemlocks exhibit more resistance to the pest and tend to survive longer.

Joining forces against adelgids

Both the balsam and hemlock woolly adelgids have changed the landscape, says U.S. Forest Service entomologist Rusty Rhea. The change began in the early 1960s, nearly a decade after the balsam woolly adelgid appeared in the Smoky and Black Mountains and began devouring 70,000 acres of nearly century-old Fraser fir. The U.S. Forest Service launched a series of control efforts, from removing strips of infested fir to spraying lindane, but they couldn't compete against the rapid spread of the pest and the quick death of the trees. Finally in 1970 Forest Service staff released adelgid predators from Europe—carefully screened for their specific targeting of the balsam woolly adelgid.

Although critics have questioned the success of the predator release, Rhea isn't as quick to judge it a failure. The fir-spruce forests have an advantage over hemlock forests: In the wild, the balsam woolly adelgid prefers trees older than age 70, so predators may have had time to establish.

"As the forest regenerated, it created a more unevenly aged forest," Rhea says. "But I wouldn't describe biocontrol as a failure. The trees also may be developing some resistance, and the age variability helps as well. We have a fairly robust population of Fraser firs now. It takes years to kill a tree."

Eastern hemlock forests, however, have not seen such success. The hemlock woolly adelgid kills hemlocks young and old, and most Eastern hemlocks die before they can reproduce. Hemlock forests support a specific variety of wildlife that needs cool, damp conditions and little temperature fluctuation. Death of the hemlock forests could have adverse effects on the wildlife they support, including brook trout and several species of migratory birds.

To slow the rapid decline of hemlock populations, the U.S. Forest Service and staff from the N.C. State Parks began soil injections of imidacloprid. The pesticide—which has a short life in the soil—is injected near the roots of the tree, and Rhea says soil and water quality testing has shown that the chemical does not move more than a couple of inches away from the root zone or into nearby streams. Trunks of treated trees are marked with blue paint or round metal tags. But Rhea doesn't see chemical control as a long-term solution: "It's kind of a Band-Aid until we get the intricacies of biocontrol worked out."

MELISSA McGAW/NCWRC

Woolly adelgids kill hemlocks by attaching to the base of the needles to feed, essentially sucking the life out of the tree. Eastern hemlocks are more susceptible to the adelgid than are Carolina hemlocks, which are genetically closer to the adelgid-resistant Asian hemlock.

With no native predators to keep adelgid numbers low, the Forest Service procured predatory beetles from China, *Sasajiscymnus tsugae*, and released them in several highly infested hemlock forests, followed years later with another species, *Laricobius nigrinus*. Rhea says more types of beetles must be released before results become apparent. Currently Forest Service experts are screening two additional beetle species, *Scymnus sinuanodulus* from China and *Laricobius osakensis* from Japan. Rhea says that lab tests show that the two predator species can reduce adelgid numbers by 70 percent. Scott Costa at the University of Vermont is also testing an adelgid-killing fungus named *Lecanicillium muscarium*.

So far, Rhea has seen limited success from the two beetle species the Forest Service has released. "We're seeing some limited success in Boone, where we've had *Laricobius* in large numbers," he says. "And we're starting to see some recovery. In the next five years, we should have something worked out, or we're not going to be successful."

Breeding resistance

Based on lab results with Fraser firs, Hain says biocontrol combined with host resistance may give hemlock forests a fighting chance. "Biocontrol may be part of the answer, but it's not the whole answer," Hain says. "The tree has to tolerate the insect in time for natural enemies to work. Right now they can't tolerate it."

Hain says that planting Fraser firs and Eastern and Carolina hemlocks that are resistant to the woolly adelgids would help the trees live longer, giving the predators a chance to kill the adelgids before they move on to other areas. He tells the story of the American Chestnut Foundation, a group of researchers who repopulated chestnut

MELISSA McGAW/NCWRC

forests with resistant American chestnut trees following their near extinction from the chestnut blight.

This kind of research takes years, but woolly adelgid-resistant trees may hold promise for a future restoration effort. And Hain already has a good start with Fraser firs. In their N.C. State University lab, Hain and graduate student Leslie Newton have grown seedlings from seeds collected at each of the six Fraser fir populations in the Appalachians. In the climate-controlled conditions of the lab, Hain and Newton try to infest the seedlings with balsam woolly adelgids. Sometimes they can't. In the lab, balsam woolly adelgids will feed on Frasers of any age, so Hain concludes that the uninfested seedlings may be resistant.

The strides Hain and his staff have made will allow them to select appropriate individual Fraser fir seedlings to use as parents for breeding resistant seedlings. The lab methods are proving useful to John Frampton, a Christmas tree geneticist who has spent the past 13 years breeding superior Fraser firs for Christmas tree production. Until now, his work has not included selection for balsam woolly adelgid resistance. But Frampton is beginning to use Hain's infestation method to evaluate some of his superior Christmas tree selections.

Though breeding resistance from natural stock found in the Smoky Mountains and other natural forest populations would be ideal, both Hain and Frampton admit that they may have to explore other options, especially for Eastern hemlock, where the number of resistant trees appears to be very small or nonexistent. One of the options is to cross Eastern hemlock to a resistant hemlock species and then "backcross" several generations with Eastern hemlock to preserve a 94 percent genetically resistant Eastern hemlock—a process that would take at least 25 years.

The other option involves extracting resistant genes from a resistant hemlock and genetically engineering them into natural seeds or cuttings. Although this last option tends to raise eyebrows, Frampton says that it would significantly shorten the time to replant trees.

"We could have trees that are 6 percent Asian hemlock and 94 percent Eastern hemlock in 25 years after three generations of backcrossing, or we can use genetic engineering and have something in five years that has only three foreign genes," Frampton says. "The hemlock forest is still going to be mostly native, and we might be able to aid the other control efforts to save whatever hemlocks are left."

Thanks to a recent U.S. Forest Service grant for hemlock host resistance research, Hain and his staff are developing ways to test hemlock seedlings for natural resistance to the hemlock woolly adelgid and study the genetics of resistance. Funding for screening and breeding programs has trickled in through private contributions, as Hain still seeks solid funding for these long-term projects.

The Eastern hemlock's hope

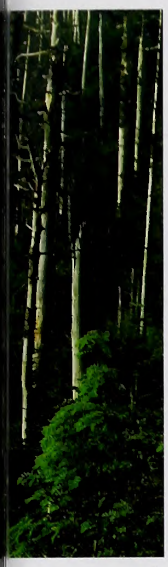
As Eastern hemlock forests continue to die, the key to bringing them back to the Smoky Mountains may lie with Camcore, located at N.C. State University. Research associate Robert Jetton currently leads a project funded by the U.S. Forest Service to collect Eastern and Carolina hemlock cones and safely replant the seeds.

The project's goal is to collect as many samples of hemlock as possible to protect the genetic diversity of the species. Jetton, along with Camcore director Bill Dvorak and research technician Andy Whittier, stores the seeds in cold storage lockers or plants them in areas untouched by the adelgid. So far the team has collected cones from 60 populations of Carolina and Eastern hemlocks in the Southeast, and it is currently collecting 60 populations from the Northeast and Upper Midwest. However, the rapid decline of Eastern hemlock has slowed these efforts.

"We're making genetically representative seed collections and putting them in cold storage or seed banks until the majority of adelgids are controlled by chemical or biocontrol methods, or we can breed resistance," Jetton says.

Jetton and his team have planted populations of Eastern and Carolina hemlock seedlings in Chile, Brazil and Arkansas. He says they have to choose areas where no other hemlocks exist—every hemlock species has a corresponding adelgid that attacks it.

To aid Hain and Frampton in eventual host resistance research for hemlocks, Jetton has planted a "seed bank" of seedlings at the Upper Mountain Research Station in Laurel Springs. Because hemlock woolly adelgid populations are present



NATURE'S WAYS

What, Exactly, is an Adelgid?
See Nature's Ways, page 39.

Pesticide treatments such as spraying (far left) and treating the roots are seen as temporary measures until scientists can establish an effective method of adelgid biocontrol. Hemlock is an important source of food and shelter for a number of wildlife species.

nearby, Jetton has to protect the small, vulnerable trees with pesticides.

"We're still learning a lot about the hemlocks' reproductive biology and seed shelf life," Jetton says. "It may be 10 to 15 years before a breeding program gets started. In the meantime, we're continuing to conserve seeds and plant seed orchards that can be used to produce new hemlock seedlings for future restoration efforts."

Whether current chemical and biocontrol efforts succeed, or genetic research produces trees that withstand the adelgids, the passion to keep fighting makes it clear that no one is willing to stand idly by. "If the hemlocks go away, there is nothing to take their place," says the Forest Service's Rhea. "We're really looking at losing a whole ecosystem, not just a tree, and that's what makes the situation so alarming." ◆

Rosemary Hallberg is a communications specialist with the Southern Region Integrated Pest Management Center.

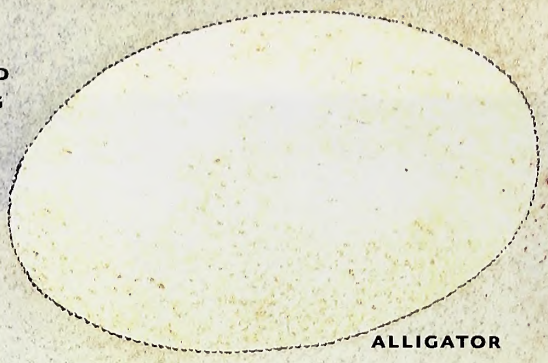
LEARN MORE

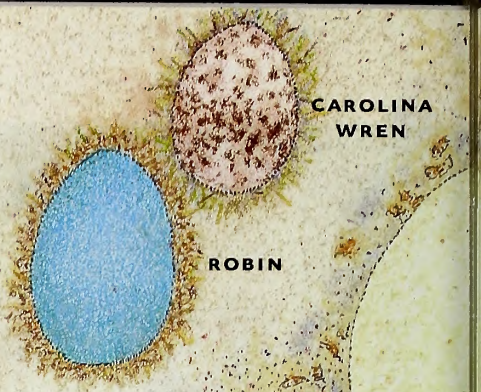
Partnership for Threatened Forests: www.threatenedforests.org

U.S. Forest Service's adelgid strategy: www.na.fs.fed.us/fhp/hwa/

Camcore's hemlock conservation project: www.camcore.org

In *Wildlife in North Carolina:* "The Fight to Save Hemlocks," Feb. 2005.



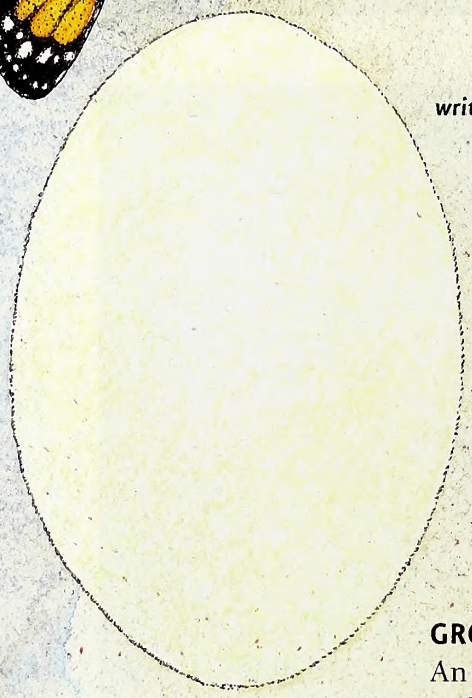


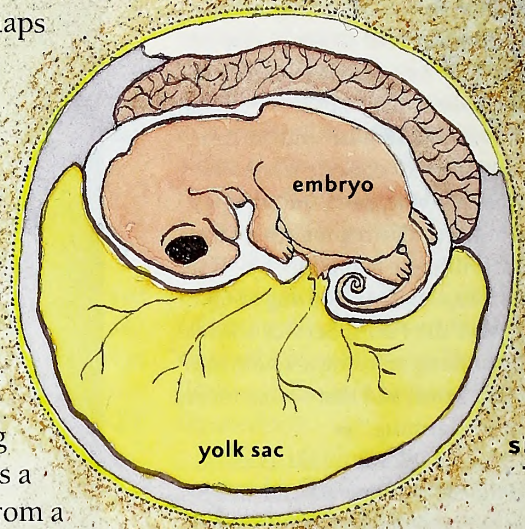
Big ones, small ones, hard ones, soft ones, plain ones, colorful ones...

All Kinds of Eggs

written by Buffy Silverman / illustrations and nature activity by Anne M. Runyon

An animal lays an egg. What will hatch from it? Will it be a bird, insect or spider? A snake or turtle? Perhaps it's an underwater egg of a fish or frog. Many animals start their lives inside eggs.



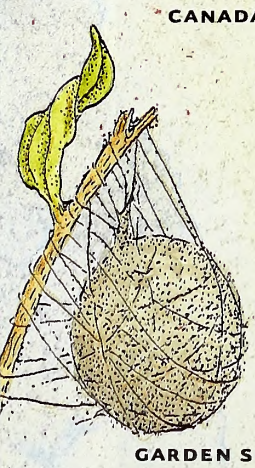


GROWING UP INSIDE AN EGG

An egg is a structure in which an animal grows and develops. The developing animal is called an embryo. It begins as a single cell from the mother. A sperm from a father fuses with the mother's cell, fertilizing it. Once fertilized, the single cell divides many times and grows. It will develop into an animal that can eat, breathe, move and survive.

Inside an egg, the embryo has everything it needs. It is surrounded with food called yolk. Membranes cover the embryo and its food, protecting it. Eggs laid on land also have a shell that keeps moisture inside so the embryo does not dry out. Shells make it harder for predators to attack.

Embryos need oxygen. Eggshells have tiny holes, called pores, through which gases travel. Eggs laid in water are not covered with shells. Water carries oxygen and other gases in and out of the eggs.



The killdeer uses a broken wing display to lure predators away from its eggs.

BIRD EGGS

Bird eggs come in a variety of sizes. A hummingbird egg is about the size of a jellybean. A Canada goose egg is about six times longer.

Birds lay blue, green, brown and other colored eggs that help keep them hidden. The speckled eggs of killdeer seem to disappear among the stones and earth where the birds nest. In early spring, a pair of killdeer scrapes a shallow nest on bare ground. The female lays three to five eggs. The parents take turns incubating the eggs by sitting on them. Their body heat keeps the eggs warm so the embryos can grow.

Eggs that are laid out of view or hidden are often white. Wood ducks build nests in tree holes or nest boxes. After laying nine to 14 creamy white eggs, the mother wood duck incubates them for 30 days. Within a day of hatching, the ducklings climb out of the nest. They jump to the ground and swim after their mom.

EGGS ON LAND

In the spring and early summer, a female snapping turtle crawls out of a pond and marches across land. She searches for a place to build a nest. Scraping with her hind feet, she digs a hole and lays 20 to 30 round eggs. The shells are flexible like leather. After covering the eggs with sand, she returns to her pond.

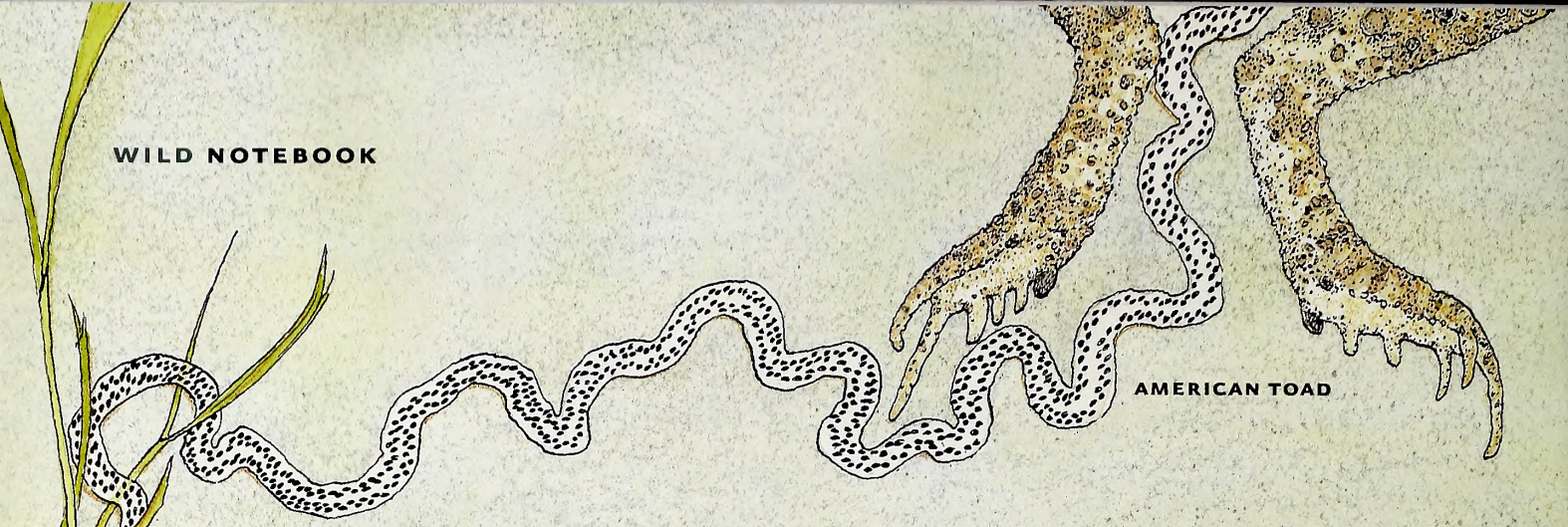
The sun warms the eggs, and baby turtles grow. The temperature of the soil determines how fast the embryos grow, and whether they develop into males or females. In warm soil (around 75° F) male snapping turtles develop. If the earth is cooler or hotter, females grow. After three or four months, the eggs are ready to hatch. But if skunks, raccoons or foxes sniff out the nest, they feast on eggs.

American alligator moms make sure their eggs are safe. They build large nests of mud and vegetation. Rotting plants warm the hard-shelled eggs. The mother alligator often stays near and chases away predators. When the babies are ready to hatch, they chirp from inside their eggs. The mother scrapes off the top of the nest and carries the hatching alligators in her mouth.

Some snakes lay eggs in loose soil or sand, under boards and logs, or in holes dug by other animals. Other snakes, however, keep eggs inside their bodies while the babies grow. A garter snake mom gives birth to many babies, each enclosed in a clear birth sac. Once the young snakes break through the sac, they care for themselves.

GARTER SNAKE

FISH CROW



AMERICAN TOAD

UNDERWATER EGGS

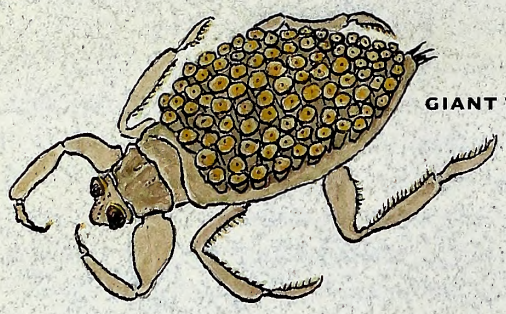
How do eggs stay safe in water? Frog and toad eggs are covered in thick jelly, which protects the eggs while the tiny black embryos grow into tadpoles.

Even so, most eggs get eaten. In a pond, a female American toad lays long strings of several thousand eggs. Then she swims away. The embryos grow quickly, turning into tadpoles in a few days. By laying many eggs that grow fast, a toad ensures that some survive.

On a warm day in February, wood frogs mate and lay clumps of eggs. In a small pond, dozens of female frogs attach thousands of eggs to twigs underwater. The egg masses are packed close to one another, so those in the center stay warmer and grow faster. If the water freezes, embryos stop growing. When the weather warms, they begin to grow again.

Fish also lay their eggs in water. A female striped bass swims up a river. There she lays 500,000 eggs. As she releases them into a river, a male striped bass fertilizes them. The eggs drift downstream. Fish and other animals eat most of them, but some hatch into larvae.

Certain insects lay their eggs underwater, too. A giant water bug finds the perfect place to lay her eggs—on a male water bug's back! After mating, she lays 100 eggs or more. The male takes good care of them, swimming to the surface of the pond and airing them. He carries the eggs for about three weeks until they hatch.



GIANT WATER BUG

Get Outside

You can be an egg watcher. Look in a shed, garage, attic or outdoors for a spider egg sac. Some sacs have only a few eggs. Others contain 2,000 eggs or more. Is there a spider or web nearby? Often spiders attach sacs to their webs. Or a spider may lurk close by, ready to protect her eggs. Check the sac from a distance. Watch for tiny spiderlings to hatch.

Salvage an eggshell the next time someone's cracking eggs in the kitchen, and take a close look at it. Can you see the membrane on the inside of it? Do the eggs you eat have white shells, or are they brown? Some farmers raise chickens that lay green or blue eggs. See if you can find various colored eggs, perhaps at a farmers market. Take a close look at the outside of the shells, as well as the white and yolk inside.

Read and Find Out

- "An Egg is Quiet" by Dianna Aston, Chronicle Books, 2006.
- "Birds' Eggs" by Michael Walters, Eyewitness Handbooks, Dorling Kindersley, 1994.
- "Eggs" by Marilyn Singer, Holiday House, 2008.
- "Growing Up: Strange Beginnings" by Bernard Stonehouse, Tangerine Press, 2000.
- "Guess What is Growing Inside This Egg" by Mia Posado, Millbrook Press, 2006.
- "The Egg" by Shelley Gill, Charlesbridge, 2001.

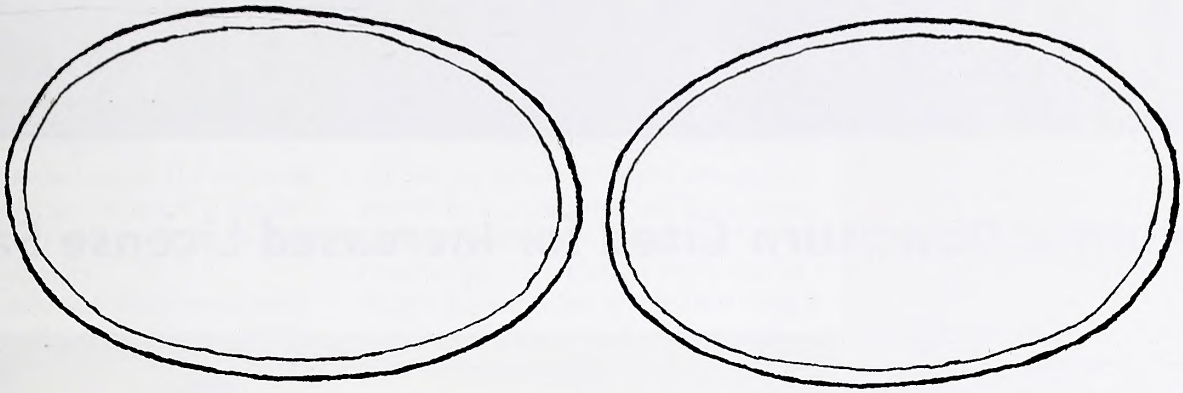
In *Wildlife in North Carolina:*

- "The Shape of Spring" by Melissa McGaw, May 2000.

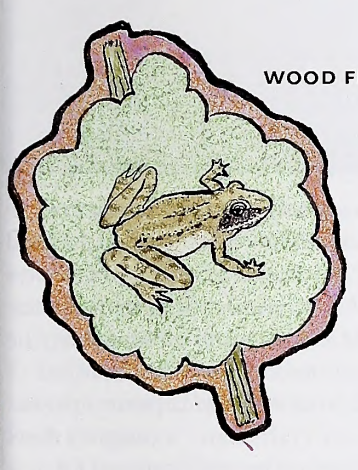
Find out more about Project WILD Workshops and literature at the Wildlife Commission's Web site at www.ncwildlife.org.

Make an Egg Mobile

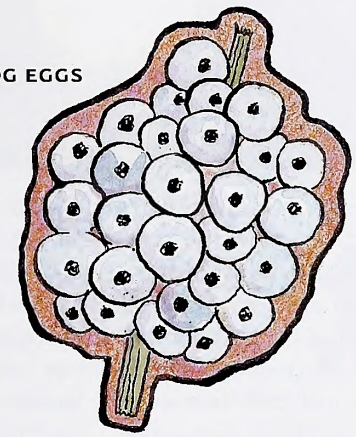
Who will hatch from this egg? You decide!

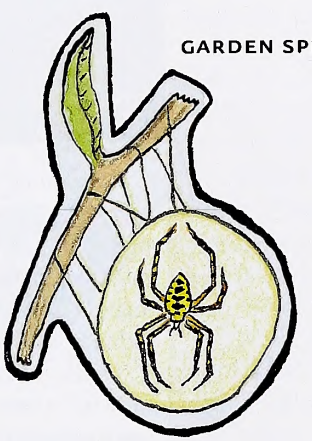


1) Draw and color your own animal and its eggshell (above).
2) Now cut out all the egg shapes and match each to its mate.
3) Place a thread inside each egg shape as you glue them together.
4) Hang up your eggs to make an egg mobile.

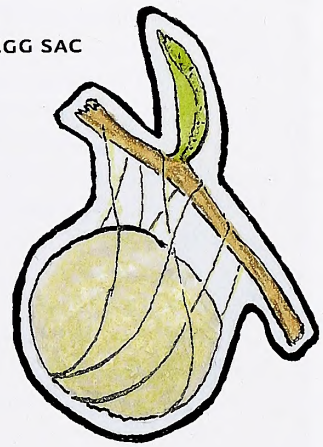


WOOD FROG EGGS

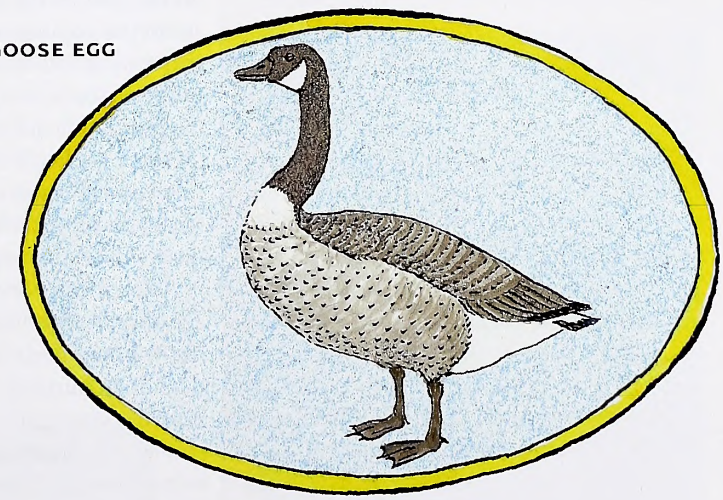




GARDEN SPIDER EGG SAC



CANADA GOOSE EGG



This activity may be downloaded at www.ncwildlife.org, the magazine page, and copied for educational purposes.

Economic Downturn Cited for Increased License Sales

Recent news reports have stated that, despite the poor economy, participation in hunting and fishing is on the rise. However, a study conducted by Responsive Management suggests that participation is increasing *because* of the economic downturn, not in spite of it.

Although many factors can affect license sales, in states that have experienced an increase some officials and sportsmen think that the economic slump is the reason. A recent report by the Recreational Boating and Fishing Foundation (RBFF) and the American Sportfishing Association (ASA) states that fishing participation, as measured by license sales, increased in 2009 when compared to 2008.

As part of a new quarterly fishing license national sales index published monthly by the RBFF and ASA, Southwick Associates, which analyzed the data, found a 7.7 percent increase in the number of licenses sold year-to-date as of Sept. 1, 2009, compared to the same time period in 2008. RBFF President and CEO Frank Peterson said that the reasons for the increase range from "a slow economy, which may allow people more time to engage in outdoor activities, to recreational fishing being a lower cost alternative to other forms of recreation."

There is statistical support for this view. In 2008, Responsive Management and the Georgia Department of Natural Resources, under a Hunting Heritage Partnership grant from the National Shooting Sports Foundation, conducted a two-phase study to identify and explore in detail the factors behind three distinct increases in hunting license sales over the past two decades. After reaching a peak in 1982, sales of hunting licenses across the United States declined steadily, according to U.S. Fish and Wildlife Service Federal Aid data. However, since 1990 there have been three notable exceptions to this overall national decline, in 1992, 1999 and 2004.

CHIP LAUGHTON

To attempt to determine the cause of these increases, Responsive Management analyzed potential internal and external factors that might have affected hunting license sales. The analysis was run on each of the 50 states individually, as well as on the nation as a whole.

Of the 43 variables analyzed, there were only two statistically significant factors that were negatively associated with hunting license sales on the national level: the percentage of the population between the ages of 65 and 69, and increases in new housing starts. In other words, the greater the proportion of the population between the ages of 65 and 69, the more likely it is that there will be a decline in hunting license sales; and the higher the rate of housing starts, the more likely it is that there will be a decline in hunting license sales.

The age factor is easily explained: as people age, they are less likely to participate in hunting or have a need to purchase a license; the decline in hunting with increasing age has been documented in numerous participation studies. The significance of the housing starts factor is not so clear. The data simply show that hunting license sales have declined in times of rapid growth in housing starts.

One reason might be the number of hunters who work in construction and related trades. In a 2007 nationwide survey of hunters conducted by Responsive Management and the National Shooting Sports Foundation, the top occupational category for employed hunters was "construction/carpentry/plumbing/electrical/craftsman," a category that strongly relates to the work required for new housing construction. In times of increased housing starts, it may be that a substantial number of hunters have less free time to go hunting as they devote more time to work.

One question remains: In hard economic times, in addition to having more time to hunt in general, do hunters increasingly turn to hunting to put food on the table? Some hunters who have been interviewed indicate that this is a motivating factor for them, and others say it is not. More research is needed to explore this hypothesis. None of the other economic indicators in the 2008 Responsive Management study showed a significant correlation to hunting license sales, which could suggest that the increase in license sales is related to time available to hunt rather than to economic reasons such as hunting for meat.

NOAA Halts Red Snapper Fishing

DUANE RAVER

NOAA's Fisheries Service has prohibited commercial and recreational fishing for red snapper in federal waters off North Carolina, South Carolina, Georgia and the Atlantic coast of Florida. The six-month rule became effective on Jan. 4. It can be extended an additional six months if authorities deem it necessary.

The South Atlantic Fishery Management Council requested that the fisheries service implement this interim rule while the council explores long-term measures to address the critical condition of red snapper.

The most recent scientific assessment shows that too many red snapper are being removed from the population too quickly, which indicates a need for protection under the Magnuson-Stevens Fishery Conservation and Management Act. Most of the remaining population consists of smaller, younger fish, which produce fewer eggs than older fish.

"The Magnuson-Stevens Act requires us to manage fish populations so they grow to a size that can sustain the largest average catch possible for the long term," said Roy Crabtree, southeast regional administrator for NOAA's Fisheries Service. "Unfortunately, the red snapper population has not been able to reach that size. Therefore, closing the fishery is the first step toward protecting this species, rebuilding the stock and ensuring fishing for generations to come."

The council is expected to recommend long-term measures to the fisheries service sometime in mid-2010. NOAA's Fisheries Service will provide additional public comment periods before implementing final long-term management measures.

Blowing Rock Trout Derby is Family Fun

Fledgling and experienced anglers alike are encouraged to participate in the 31st Annual Blowing Rock Trout Derby on Saturday, April 3, and Sunday, April 4. The town's Broyhill Lake will be stocked with hundreds of fish in the days leading up to the derby, and trout caught in any North Carolina public waters on derby days are eligible for trophies and prizes.

The N.C. Wildlife Commission supports the Blowing Rock Trout Derby with "Fish for Fun" bags, and stocked fish in Broyhill Lake are provided by the Wildlife Resources Commission's Table Rock Hatchery.

"It's wonderful to see so many folks from all over the region come to town and help us usher in spring with a truly unique mountain experience," said Tracy Brown, executive director of the Blowing Rock Tourism Development Authority. "This area is known for great trout fishing and any time we have a chance to crow about it, we will. This event brings families out for real together time in the streams and lakes around this area, and it also gives us an opportunity to introduce lots of children to an outdoor sport they'll enjoy for a lifetime."

Trophies will be awarded for winners in five divisions: Men, Women, Girls (12–14), Boys (12–14) and Small Fries (11 and under). There will be cash prizes for the largest fish in three species—brown, brook and rainbow. In addition, prizes will be awarded for landing any tagged fish in Broyhill Lake. There is no entry fee and preregistration isn't required.

Trout Derby hours are 6 a.m.–5 p.m. on Saturday and noon–4 p.m. on Sunday. Overnight accommodations are varied and plentiful in and around Blowing Rock. For details, visit www.blowingrock.com. For more information on the Trout Derby, contact the Blowing Rock Visitor Center at 1-877-750-4636.

e NEWSLETTER

Get N.C. Wildlife Update—news including season dates, bag limits, legislative updates and more—delivered to your Inbox from the N.C. Wildlife Resources Commission. Sign up at www.ncwildlife.org/enews.

Fly Masters Returns with New Category

The Pisgah Fly Masters, a popular fly-fishing tournament on the Davidson River, returns for a third year with the addition of a professional category.

On March 20, anglers will test casting skills at the Pisgah Center for Wildlife Education, with top finishers advancing to a catch and release fishing competition on March 21 along a private stretch of the Davidson River.

The new category for professionals is for anyone who has worked in the fly-fishing industry within the past 10 years or is a member of a state or national fly-fishing team.

A youth category is open to ages 10–15. Nonprofessional anglers 16 and older will compete in the fisherman class.

Early registration ends on March 3, with fees of $30 for youth and $50 for adults. After March 3, fees are $50 for youth and $75 for others, with registration ending March 20. For rules, prize list and entry forms, contact the Pisgah Center for Wildlife Education at (828) 877-4423 or e-mail emilie.johnson@ncwildlife.org.

All money raised will go toward programming at the Pisgah Center for Wildlife Education, which hosts the event. Davidson River Outfitters sponsors the event.

Located near Brevard and adjacent to the Bobby N. Setzer State Fish Hatchery, the Pisgah Center for Wildlife Education is an N.C. Wildlife Resources Commission facility with aquatic ecosystems and cold water conservation exhibits and displays.

JENNIFER ROWE / NCWRC

CALENDAR OF EVENTS

Friday–Sunday, March 5–7

See some of the top white-tailed deer taken in North Carolina over the past year, plus the latest in hunting and outdoor equipment at the Wake County Wildlife Club's 30th annual Dixie Deer Classic on the N.C. State Fairgrounds. Hunters also may have deer jawbones aged by N.C. Wildlife Resources Commission biologists and have their mounts scored.
Visit www.dixiedeerclassic.org.

Saturday, March 13

Learn about saltwater fishing at the Get Hooked Fishing School at the N.C. Aquarium at Pine Knoll Shores. Registration fee for the one-day event is $50. Contact Pam Pittman at (252) 247-4003, ext. 257, to register.

Saturday, March 20

Enjoy a traditional five-course hunt club dinner and experience the sporting heritage of Currituck County inside the private, working hunt club at Pine Island near Corolla. An auction to benefit the preservation of the Whalehead Club follows. Contact (252) 453-9040, ext. 3, for more details.

Saturday–Sunday, March 20–21

Check out hunting and fishing exhibits, wildlife art displays, decoys and boats at the Cape Fear Wildlife Expo at the Coastline Convention Center in Wilmington.
Visit www.capefearwildlifeexpo.com.

Readers should check with the contact listed before traveling to an event. Items for listing should be conservation-oriented and should be submitted at least four months in advance to jim.wilson@ncwildlife.org, or call (919) 707-0177.

Commission Tweaks Fish Attractors

The N.C. Wildlife Resources Commission has placed four fish-attractor reefs in Lake Higgins. The attractors are marked by orange-and-white buoys.

While there's nothing new about the design of the fish attractors, the way they're situated in the lake is a novel idea that Corey Oakley, a fisheries biologist with the commission, hopes will improve the fishing in the 226-acre impoundment, located in northern Guilford County.

KEITH HENDRICKSON/NCWRC

Wildlife Commission employees encircled structures for larger fish with porcupine attractors for smaller fish.

Commission staff, along with personnel from Greensboro Watershed Parks, Lake Higgins anglers and other volunteers, encircled PVC pipe-and-plastic-barrel fish structures with porcupine fish attractors to create an artificial reef that measures about 5 feet in height and 15 feet in diameter.

Commission biologists hope that this design will attract a greater diversity of fish. Ongoing studies conducted in lakes Cammack (Alamance County) and Townsend (Guilford) indicate that, regardless of how they're made or of what material they are constructed, fish attractors attract fish, although some do a better job than others.

"We're in the middle of a three-year survey on lakes Cammack and Townsend to determine the effectiveness of the various types of fish attractors that we placed in those lakes last year," Oakley said. "Data collected so far suggest that the fish attractors are doing their job — they're attracting fish — but one size doesn't fit all.

"Larger fish, such as largemouth bass, channel cats and pickerel, congregate around the PVC pipe-and-barrel fish structures, while smaller fish, such as sunfish and crappie, seem to prefer the complexity of the porcupine attractors," Oakley continued. "As their name implies, these structures look like giant porcupine quills connected to a sphere that forms a circular configuration."

While barrel attractors may not hold the numbers of fish that porcupine attractors do, they hold the bigger fish, so the combined structure should attract a greater diversity of fish as well as greater numbers of the fish.

Enhancing the fishing in all three of Greensboro's lakes — Townsend, Brandt, and Higgins — was the impetus for installing fish attractors, as well as the supplemental stocking of largemouth bass in Lake Higgins in 2008.

Surveys in Lake Higgins earlier this year showed that the stocked largemouth bass were doing well and, with an existing fishery of channel catfish, sunfish and even chain pickerel, habitat enhancement through artificial fish attractors was the next logical step to improve fishing.

While there are no official plans to survey the effectiveness of the artificial reefs, Oakley said the fish attractors placed in lakes Townsend and Cammack in April 2008 were already attracting fish three months later. He expects similar results with the reefs in lakes Higgins and Brandt.

IN SEASON

This month, these seasons are open in North Carolina:

Snow, Blue and Ross' Geese: Through March 10.

Roanoke River Striped Bass Management Area: March 1–April 30 unless closed by proclamation.

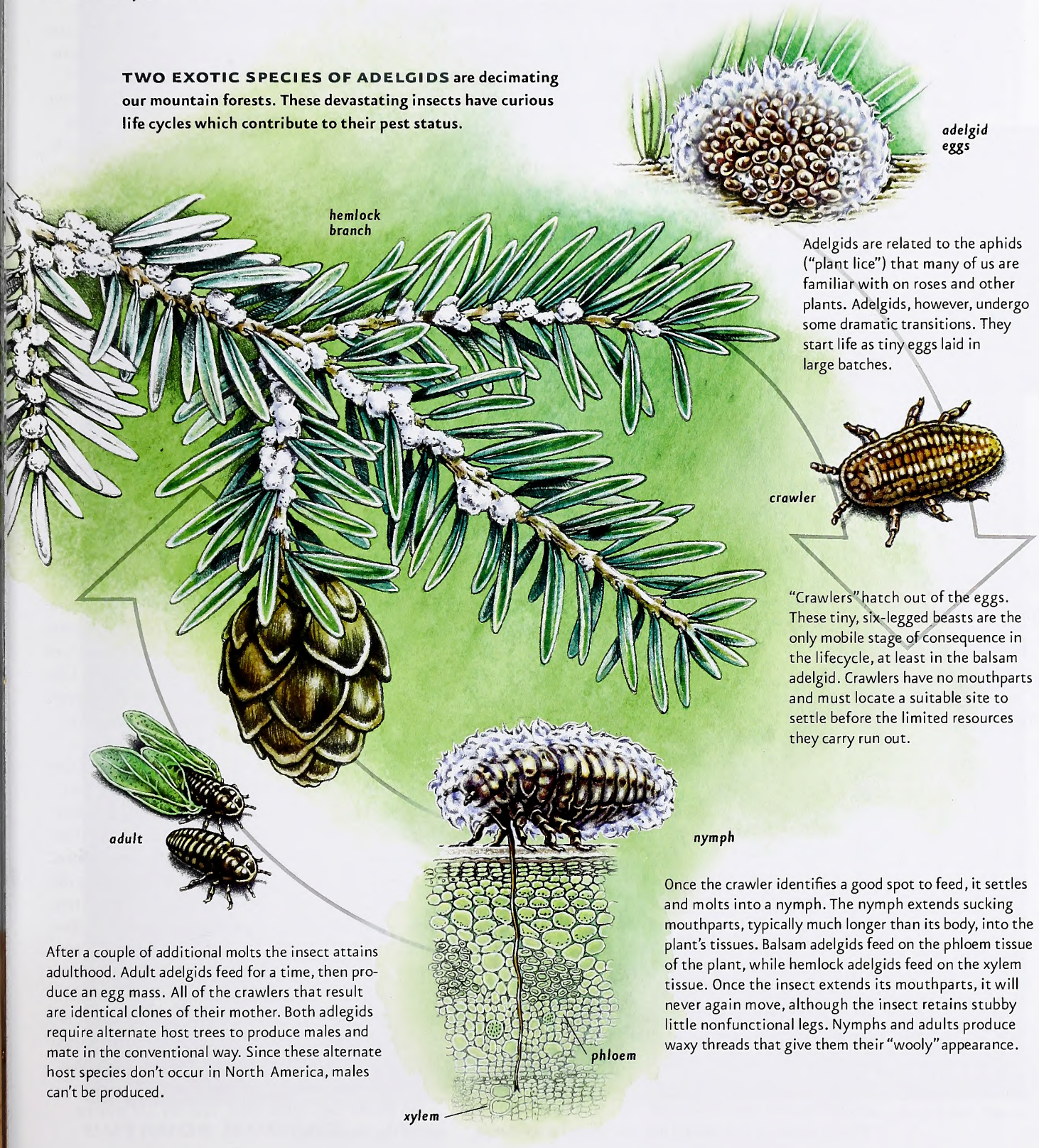
There is no closed season or bag limit for groundhog, coyote, striped skunk and nutria. There is an open season for taking beaver with firearms during any other open season for the taking of wild animals.

Check the *2009–2010 North Carolina Inland Fishing, Hunting and Trapping Regulations Digest* for bag limits and applicable maps or visit www.ncwildlife.org.

What, Exactly, Is An Adelgid?

written by Clyde Sorenson
illustrated by Jim Brown

TWO EXOTIC SPECIES OF ADELGIDS are decimating our mountain forests. These devastating insects have curious life cycles which contribute to their pest status.



Adelgids are related to the aphids ("plant lice") that many of us are familiar with on roses and other plants. Adelgids, however, undergo some dramatic transitions. They start life as tiny eggs laid in large batches.

"Crawlers" hatch out of the eggs. These tiny, six-legged beasts are the only mobile stage of consequence in the lifecycle, at least in the balsam adelgid. Crawlers have no mouthparts and must locate a suitable site to settle before the limited resources they carry run out.

Once the crawler identifies a good spot to feed, it settles and molts into a nymph. The nymph extends sucking mouthparts, typically much longer than its body, into the plant's tissues. Balsam adelgids feed on the phloem tissue of the plant, while hemlock adelgids feed on the xylem tissue. Once the insect extends its mouthparts, it will never again move, although the insect retains stubby little nonfunctional legs. Nymphs and adults produce waxy threads that give them their "wooly" appearance.

After a couple of additional molts the insect attains adulthood. Adult adelgids feed for a time, then produce an egg mass. All of the crawlers that result are identical clones of their mother. Both adlegids require alternate host trees to produce males and mate in the conventional way. Since these alternate host species don't occur in North America, males can't be produced.

High Lonesome Ear Worms

written by Jim Dean

Henry David Thoreau would no doubt be shocked to hear that we are apparently no longer destined to lead lives of quiet desperation. Thanks to modern technology, any momentary desperation we happen to be experiencing can be accompanied by a continuous musical soundtrack—via tiny speakers and an iPod or similar device. If nothing else, this may offer relief to those of us afflicted with ear worms.

JIM DEAN

An ear worm, in case you aren't aware, is a compulsive condition that introduces without your consent some silly phrase or snippet of music—usually a detestable advertising jingle—into your mind where it plays over and over in a continuous loop for hours or days until it is replaced by something equally annoying. Some ears are nests of worms. Fortunately for me, at least, some of my worms are apparently classically trained, or have an interest in jazz, old standards or other musical formats that are easier to tolerate.

"What we lacked in talent, we more than made up for in volume and fractured harmony."

When I first began fly-fishing for trout on the handsome limestone streams of Pennsylvania in the early 1960s while I was stationed nearby in the Army, my ear worms tuned into Vivaldi's Four Seasons, Schubert's "Trout" Quintet or, at worst, Billie Holiday. That beats getting stuck with something like "Do you like Piña Coladas?" or "Cincinnati Dancing Pig; he's a barnyard Mister Big."

After two years, I returned to North Carolina and began to fish our trout streams with Tom Cooper, Andy Aretakis and Ron Evans. Being poor students, we did a lot of stream-side camping, and Tom and Andy always pulled out their guitars after supper to pick a little bluegrass. It was a better match than Vivaldi for these ancient mountains, remote tumbling streams and dark hollows.

We also hung out at music festivals when we weren't fishing, and developed an appreciation for traditional mountain ballads and the raw, primitive music that predated bluegrass. When I first heard "I Hear'd my Mother Call my Name in Prayer" on an old Union Grove album, and Ralph Stanley's original "Man of Constant Sorrow," my ear worms went into culture shock.

In the late 1960s, we met A.J. Johnson and his son Alvin. I've written previously about the many wonderful fishing trips we shared while staying in their cabin on Wilson Creek. A.J., it turned out, had played tenor banjo and mandolin with small groups during the 1930s, mostly for square dances. For sure, we had an eclectic play list, and what we lacked in talent, we more than made up for in volume and fractured harmony. We would usually end the evening with Johnson's favorite hymn, "In the Garden," and I believe our rendition would have killed snakes in a fundamentalist church.

But it was Herman Coffey who made the most memorable impression on us. Herman lived next to Johnson's Edgemont cabin, and he would occasionally drop in to sit quietly and listen. He gave us no clue that he had any musical talent until one night when he followed me into the kitchen.

"I need something for my throat," he said with a raspy voice.

"I've got some cold tablets and cough medicine," I replied.

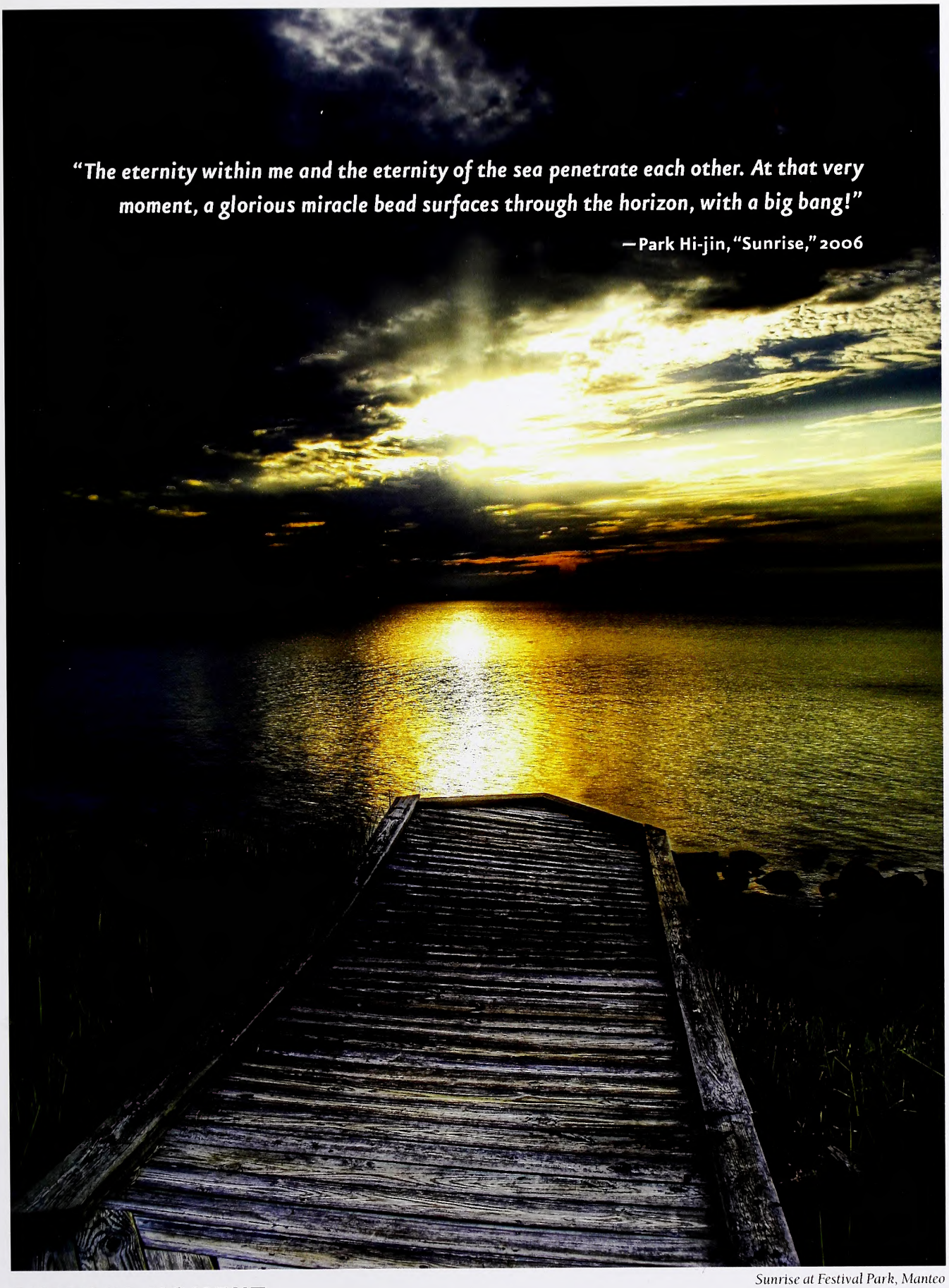
"No, I mean that," he said, pointing at Johnson's half gallon of Ancient Age sitting on the sink. I poured him a sip, and noticed that he returned to the kitchen several times. Finally, he turned to Johnson. "You mind if I try your mandolin?" he asked. To everyone's surprise, he deftly retuned it.

"You boys can follow along if 'n you'uns like," he said, and he lit into "Rawhide." We were stunned. I had never heard anyone play a mandolin better or faster, nor have I since. Herman ripped out songs like a man possessed, then he said he wanted to change the pace. "Let's try this," he said. "I'm a-gonna sing and you'uns harmonize on the chorus." His version of "Life is Like a Mountain Railroad" gave us chills, and then he topped it with a doomed prisoner's last lament for his lover, "Will You Visit Me on Sunday?"

Turned out Herman had his own "strang" band that played small venues throughout the hills. After that night, he began to visit us regularly, bringing his own 1906 Gibson mandolin. We took good care of his throat. Herman moved on in a few years, and I've long since lost track of him. But I still have a cassette he gave me.

Late last fall, I was headed back to Edgemont from Tennessee where I had fished until dark. Just before I turned onto the 12-mile twisting gravel road from Linville, I found that old tape. The full moon was so bright that I turned off the headlights and coasted slowly down the brilliant path through mountains and hollows awash in silvery mist. And Herman was right there again, still wondering, "Will her big blue eyes be misty, will they brush away a tear?"

I'm pretty sure mine were, and my ear worms nailed the harmony.

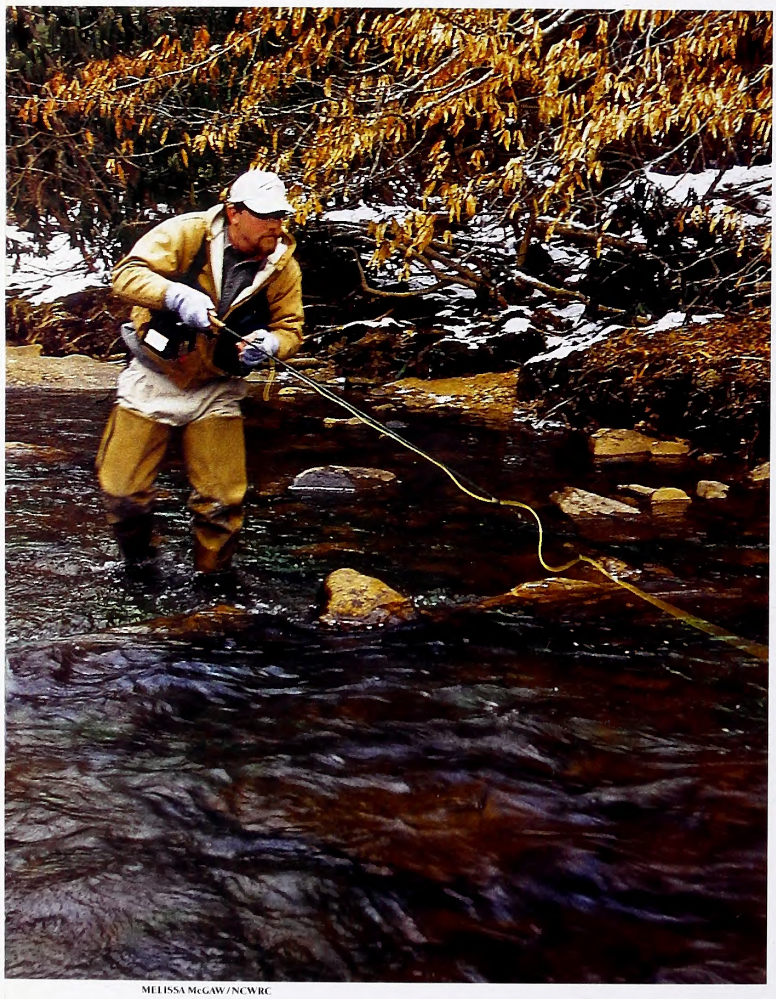


NICHOLAS YELLE

Sunrise at Festival Park, Manteo

OUTDOOR MOMENT

IN THE APRIL ISSUE



MELISSA McGAW/NCWRC

◀ **TROUT TAKE**
A recent survey indicates that the economic impact of trout fishing in North Carolina is significant.

WET BEHIND THE EARS
A 20-year project to manage a few farm ponds consisted of big mistakes and equally big successes.

GETTING TO KNOW HIM
To take down that tough gobbler this season, learn his habits and where he likes to hang out.

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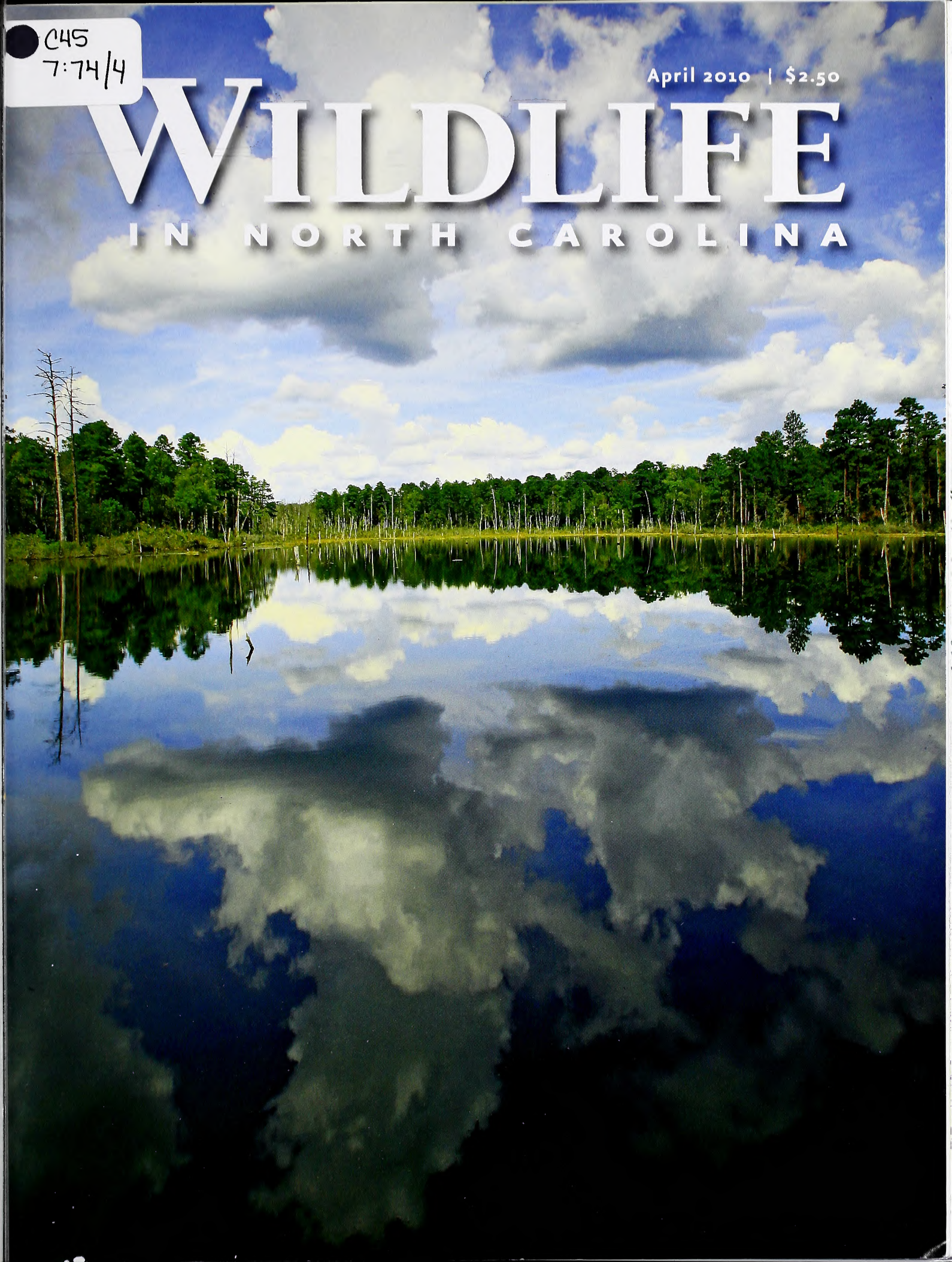

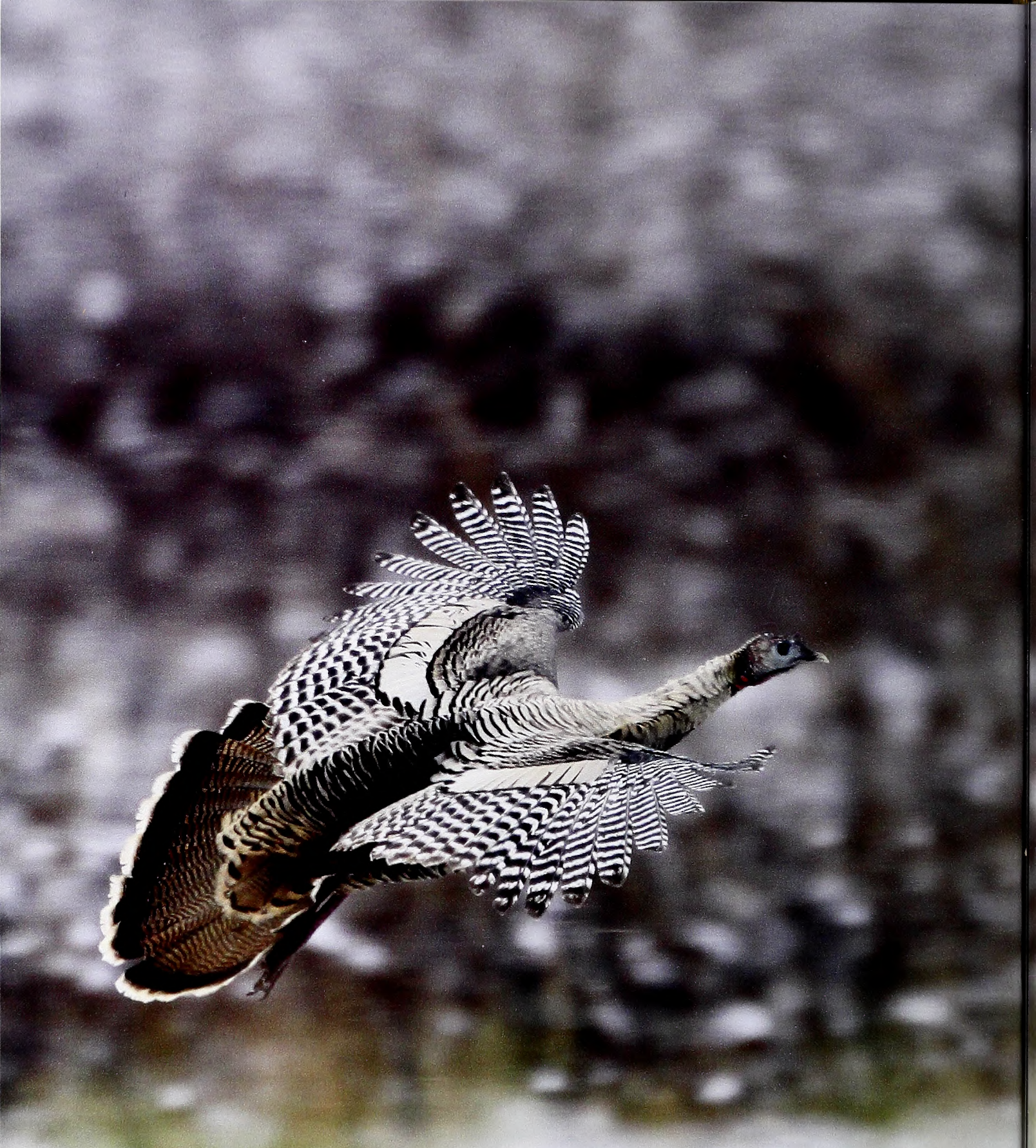

Understanding wild turkey behavior is crucial to harvesting a bird — a rare, partially leucistic specimen such as this one would just be a bonus.

PHOTOGRAPH BY TODD PUSSER.

Volume 74 | Number 4

WILDLIFE IN NORTH CAROLINA

N.C. DOCUMENTS CLEARINGHOUSE

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Cover: Knowing what's under the surface — and how to keep desirable species there — are keys to managing a man-made pond for good fishing. PHOTOGRAPH BY TODD PUSSER.

Wildlife in North Carolina is the official educational publication of the North Carolina Wildlife Resources Commission. It is dedicated to the sound conservation of North Carolina's wildlife and other interrelated natural resources and also to the environment we share with them.

EDITOR'S NOTE

Sometimes fishing is much more than just fishing. Outdoor writers have waxed poetic and prosaic on that topic for decades, and it is still true. Fishing can include elements of solitude, camaraderie, peace, struggle, vacuity, mental challenge, idleness, exertion, guilelessness and cunning. It's everything from sleeping in a lawn chair beside a farm pond to mortal combat with a half-ton beast in the Gulf Stream.

CHIP LAUGHTON

But it can be so much more as well. Without sounding too trite, fishing can be life. Untold numbers of North Carolinians rely on mountain trout fishing to pay the mortgage and put food on the table. A recent study ("Cash Flow," page 4) revealed that the economic impact of trout angling in the state is $174 million. That puts the simple act of trout fishing in an economic category alongside some significant North Carolina businesses such as the wine industry.

And then there is an entirely different take on fishing as life. Regular contributor Bruce Ingram could honestly say that fishing is one of the biggest aspects of his life—he has written several books about it, and he does it with passion and frequency. But last year, Bruce had the opportunity to attend a session of Casting for Recovery ("Reel Healing," page 26), a national program that provides angling opportunities and support for women who have breast cancer or have survived it.

Bruce accompanied his wife of three decades, Elaine, who was undergoing treatment for breast cancer at the time. She got a lot from the program, but it's clear in Bruce's touching account of the experience that he was able to use the program to help himself deal with his wife's illness for the first time since she was diagnosed with the disease. That day, he found a peace on the water that countless hours of spin and fly-fishing had never given him before.

Fishing can be whatever you make it, whether it's a respite, a battle or something that is yours alone. April is the traditional opening of trout season, but as you probably know, there is good fishing somewhere in North Carolina every month of the year. Get out there and find out what fishing can be for you.

Greg Jenkins

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Clear-Cut Opinions

On behalf of the N.C. Wildlife Federation, I wish to express appreciation and commendation to author David Hart and the magazine for the informative and educational article, "Clear-Cut Benefits," in the Feb. 2010 issue. The article clearly sets forth the benefits to wildlife from managed timber clear-cuts and explains the proper role that this practice plays in sound forest and wildlife management.

An important principle is often overlooked as management plans for our public lands are developed and administered: The key to having productive wildlife habitat is diversity and interspersion of vegetative types of different ages and composition. Purposefully designed, even-aged timber management prescriptions as depicted and explained in the article create cover, food, corridors and the conditions necessary to meet the life cycle requirements for game and nongame species alike.

Your presentation of this vital component of balanced, ecologically based management plans gives strong support to the position of wildlife managers who are trying to create early successional habitat in our predominantly closed-canopy forests on the public lands of western North Carolina. Management plans with an early-successional habitat element provide healthy and diverse forest ecosystems, as well as better conditions for wildlife.

Tim Gestwicki, Executive Director
North Carolina Wildlife Federation
Charlotte

Thanks for bringing to light the misguided direction our national forest managers have taken in recent years regarding timber and wildlife management on the Pisgah and Nantahala National Forests in Western North Carolina. David Hart's "Clear-Cut Benefits" article struck a nerve with me as I've sadly watched the diversity of wildlife habitats decline on these important public lands due to benign neglect.

Common sense dictates to me that a mosaic of various stages of forest succession is the best scenario for wildlife on a landscape scale. The virtually contiguous even-aged forest (60 to 100 years old) structure we have on most of the Pisgah and Nantahala national forests doesn't bode well for most wildlife species we all want on this landscape, regardless if you are a hunter or not. Hart's article should be a wake-up call for all of us.

Steve Evans
Canton

I am writing in response to David Hart's article concerning clear-cuts and hunting opportunities in western North Carolina. The article overstates the agro-forestry perspective in relation to debates that have gone on about clear-cutting for at least the past two decades, covering the time I've been involved with timber and forest zoning issues on national forests in the Blue Ridge Mountains. The position of Steve Henson and the Multiple Use Council, which is actually a front group for timber interests, has changed little over this time, despite a great deal of field work and historical research that reveals much about the pattern of land acquisitions in the region. Contrary to Steve's assertions, the late Dr. Bob Zahner often commented that ruffed grouse do not rely solely on early successional habitat to survive.

My objection to Mr. Hart's conclusions are based on three themes consisting of 1) lack of historical perspective, 2) lack of recognition that complexity is inherent to forest ecosystems, and 3) lack of democratic processes with regard to national forest timber policies. First, the regulation of timber cutting practices, particularly on private lands, has been either curtailed or blocked repeatedly in the history of timbering in the United States. With regard to the national forests there was a sharp turn toward policies favoring timber interests after World War II, and the effects of this have remained with us ever since.

Second, there is a body of work related to forest dynamics that Mr. Hart leaves out, particularly the extensive ecological work of James Runkle and Peter White presented in "The Ecology of Natural Disturbance and Patch Dynamics" (1985). These scientists give rates of natural disturbances for temperate forests, and the variety of habitats that are created in ongoing tree-fall-gap processes. The conflict between those who seek to reduce forests to timber-producing machines, and those who recognize forests as complex systems intimately related to geography, climate, soil moisture regimes, soil types and rock types has been going on for many decades.

Third, the Forest Management Act of 1976 was supposed to usher in an era of public participation in planning processes for the national forests, though this has not been the case in my experience. Debates on difficult issues such as clear-cutting should be run by democratic processes, including both experts and concerned citizens, though the U.S. Forest Service frequently pits interest groups against one another, and tends to choose alternatives that favor timber interests. Taking the agency to court numerous times to curb aggressive USFS timber cutting policies is part of a democratic process, though it also reflects the autocratic nature of decisions that are made concerning national forests in the region.

Rob Messick
2007 Forest Conservationist of the Year
Governor's Conservation Achievement Awards
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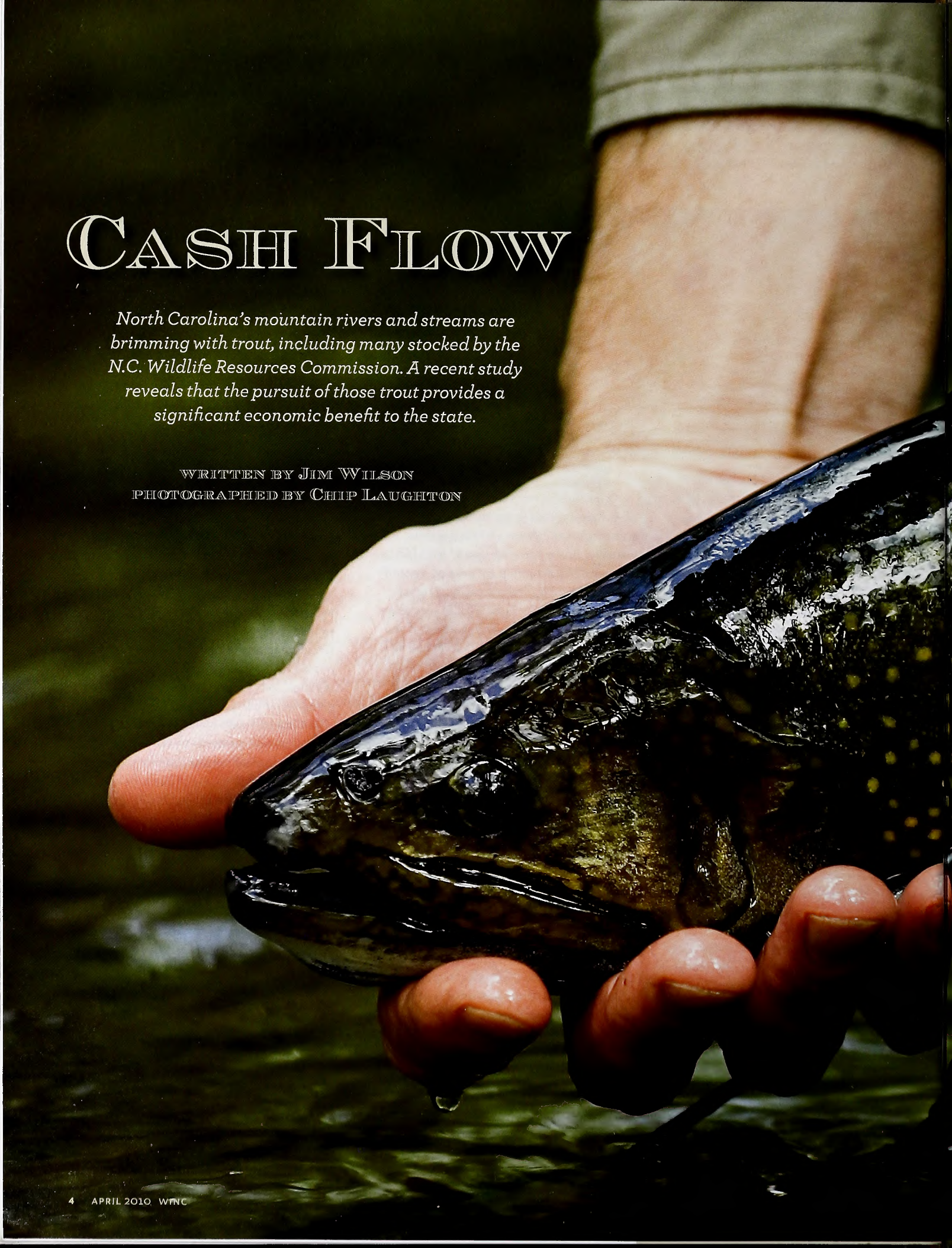
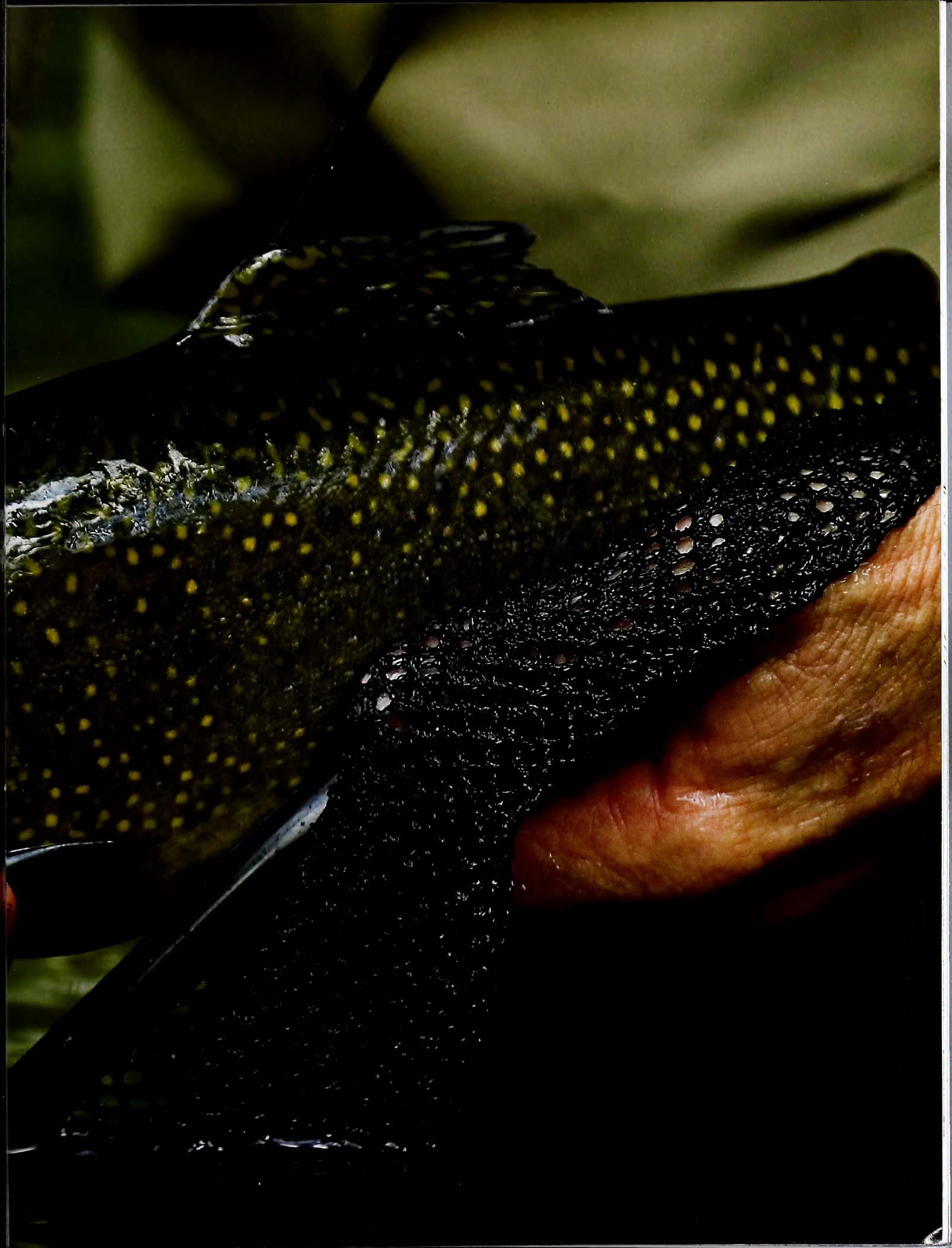
Cash Flow

North Carolina's mountain rivers and streams are brimming with trout, including many stocked by the N.C. Wildlife Resources Commission. A recent study reveals that the pursuit of those trout provides a significant economic benefit to the state.

WRITTEN BY JIM WILSON
PHOTOGRAPHED BY CHIP LAUGHTON





"If you go to the Charlotte Fly-Fishing Show, you'll see all sorts of people who have never fished in their lives, but are interested in outdoor recreational activities."

What is the value of a trout? The answer depends on whether you're talking about economics or aesthetics. There might be as many ways of defining the aesthetic worth of a trout as there are anglers in North Carolina. The value of the fish is intertwined with the experience of fishing, with the thinking or dreaming about fishing.

As far as economics, the value of the fish can be pretty straightforward. In 2008, for example, the N.C. Wildlife Resources Commission stocked approximately 830,000 trout in western North Carolina at a cost to the agency of about $1 million. The economic contributions of those fish to the state, however, remained undetermined until a recent report.

"The Economic Impact of Mountain Trout Fishing in North Carolina," a study conducted by Responsive Management and Southwick Associates, revealed that the commission's trout program is bringing considerable money to the Mountains, a region that has experienced the loss of many jobs in the manufacturing and furniture businesses. The study was conducted under contract with the commission and funded by Federal Aid in Sport Fish Restoration funds.

In 2008, the study found that the nearly 93,000 trout anglers who fished our state spent $146 million on trips and equipment. When the secondary effects of those dollars (such as employment and income) were figured, the economic output of the commission's trout management program reached $174 million, which puts it just behind the western North Carolina craft guild and not too far behind the state's wine industry in economic impact.

The telephone survey contacted over 1,200 resident and nonresident licensed anglers and questioned them about their number of days and types of trout waters fished, trends in participation in 2008, duration of trips, and expenditures. Survey results coupled with the number of licensed anglers in 2008 and estimates of fishing activity provided estimates of total angler expenditures and goods and services purchased. "This information is important for evaluating the effectiveness of our trout management program," said Kent Nelson, fisheries program manager for the Division of Inland Fisheries. "Results of this survey in conjunction with a 2006–2007 trout angler opinion study help us understand and meet angler expectations and will guide undergoing revisions to our trout management plan."

"We were interested in knowing the value of our different trout fishing programs in North Carolina," said Doug Besler, supervising fisheries biologist for the Mountain region. And that's exactly what the commission got. The total economic impact in 2008 of Hatchery Supported waters measured $72.7 million, $55.2 million for Wild Trout waters and $46.5 million for Delayed Harvest. Besler calculated, based on the number of locations that year, that each Hatchery Supported location was worth approximately $500,000, and each Delayed Harvest location about $2.2 million to North Carolina's economy.

Hatchery Supported were the most frequently fished waters (625,147 days), followed by Wild Trout waters (422,671 days); and Delayed Harvest waters (374,611 days).

These data confirm information from the 2006–2007 trout angler opinion survey, which revealed that anglers most often fished and preferred to fish Hatchery Supported waters. Four of the commission's state fish hatcheries—the backbone of the Wildlife Commission's trout program—combined to produce and distribute more than 900,000 brook, brown and rainbow trout in 2009. Ninety-six percent of trout stocked into Hatchery Supported and Delayed Harvest waters average 10 inches or longer, with the remainder over 14 inches.

From 2000 to 2009, the numbers of trout stocked by commission hatcheries increased from 775,868 to 901,477. Major renovations and new technologies such as liquid oxygen systems enabled the hatcheries to meet increasing stocking demands, but space and water remain limiting factors. Meeting the challenges of increased production could require additional renovations of existing facilities and construction of new hatcheries.

The information obtained from the recent survey does more than document economic contributions of trout anglers to North Carolina. It paints a picture of a fishery in a state

of change. Decades ago, trout fishing in the mountains was a more regional and local affair. In those days, the mountains were remote, the people clannish and the journey was something of an expedition. Trout-fishing day trips, except for locals, were all but nonexistent. Those days are no more.

One trend the survey showed is that the number of trout anglers from the Piedmont and its large urban areas—Raleigh, Charlotte, Greensboro and Winston-Salem—is increasing, while the relative number of anglers from the mountain region is decreasing. The number of mountain residents who trout fish remains sizable, but the percentage is decreasing.

"If you go to the Charlotte Fly-Fishing Show, you'll see all sorts of people who have never fished in their lives, but are interested in outdoor recreational activities," Besler said.

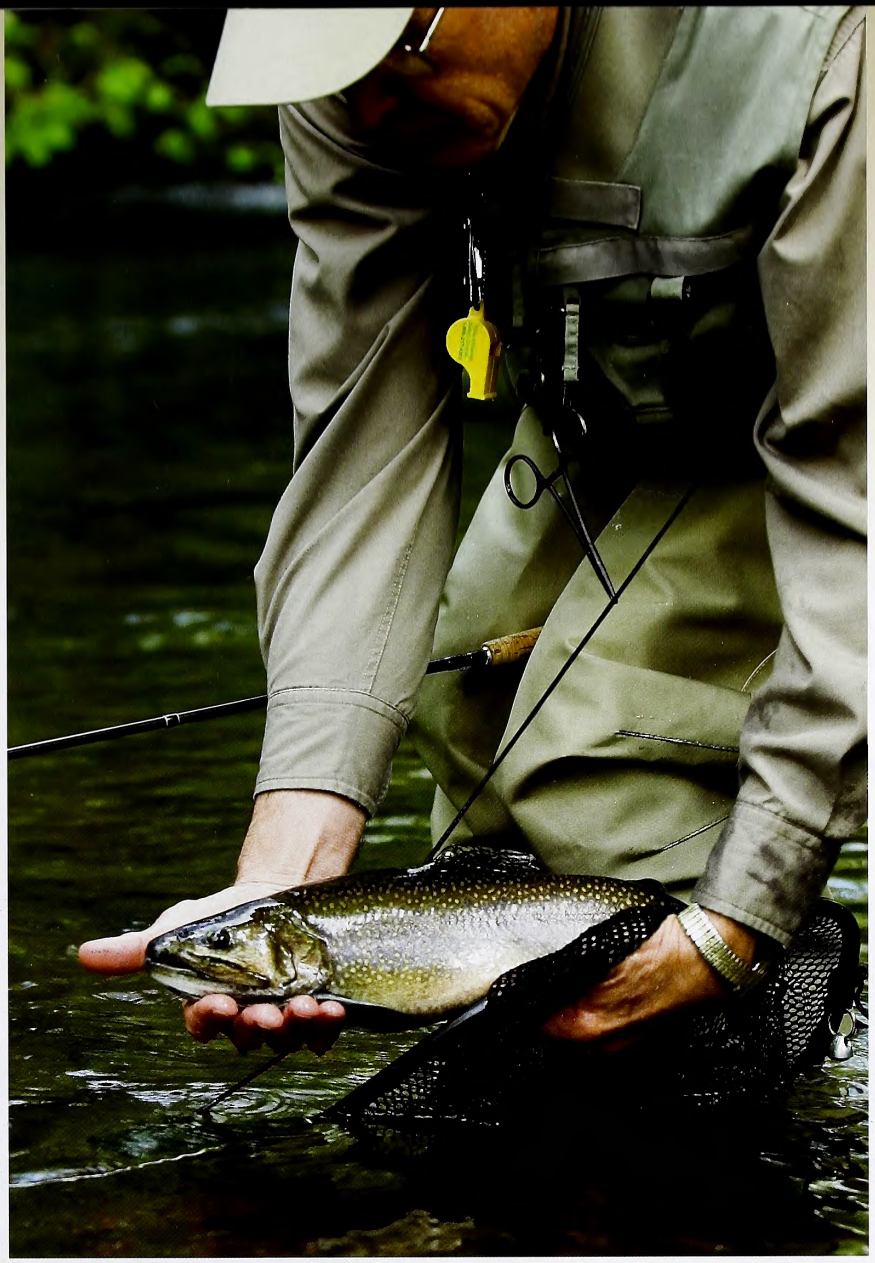
Today's trout angler, or landowner, might be more a Charlotte banker, originally from New York, than a Mountain native such as legendary fisherman Mark Cathey. That demographic change is having effects on trout fishing, particularly as it relates to fishing access.

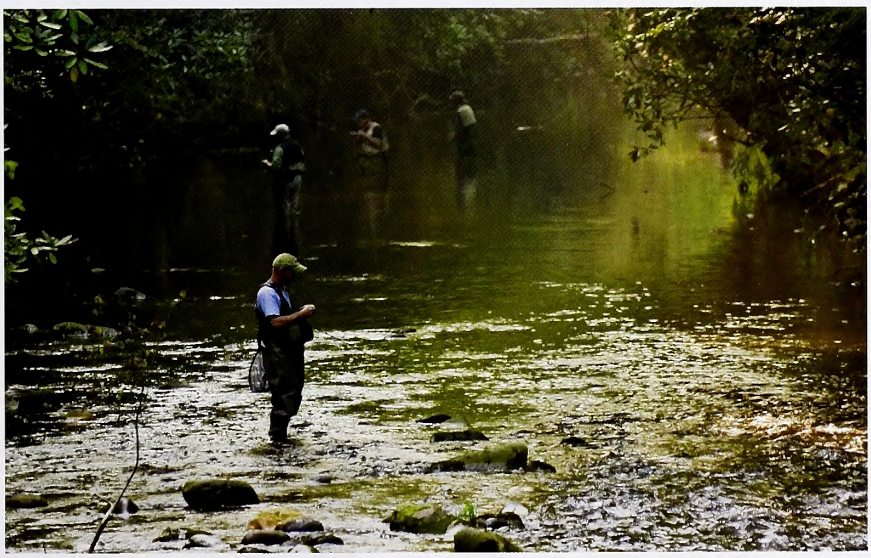
For many years, commission biologists would simply have verbal agreements with landowners to allow angler access to streams flowing through their property. "For years and years—the first 60 years—that worked great," Besler said. "It was primarily local anglers fishing streams who knew the landowners. Now it's out-of-town anglers and landowners." Increased population growth and development in the mountains has created difficulties.

"We've seen an increase in posting against trespass," Besler said. "Landowners are scared of liability issues, even as it relates to fishing. On average, about nine percent of every stream in our program is posted against trespass on private land. In 25 years we're likely to see more posting. As such, it's critical to maintain public fishing access to private lands and find new fishing opportunities."

Providing access for fishing or hunting is a priority for the Wildlife Commission. It's also at times a daunting task, and almost always an expensive one. And obtaining access on trout streams can be particularly expensive.

"It's a lot cheaper to buy land that's already been logged for a game land in the





Trout angling in the Mountains is a traditional activity that has evolved into a huge fishery with significant economic implications for regional towns and counties.

TROUT NUMBERS

THE BASICS	
Trout Anglers	92,769
N.C. Resident	76,761
Nonresident	16,008
Age	50
Sex	93 percent male
Days Fished	1.42 million

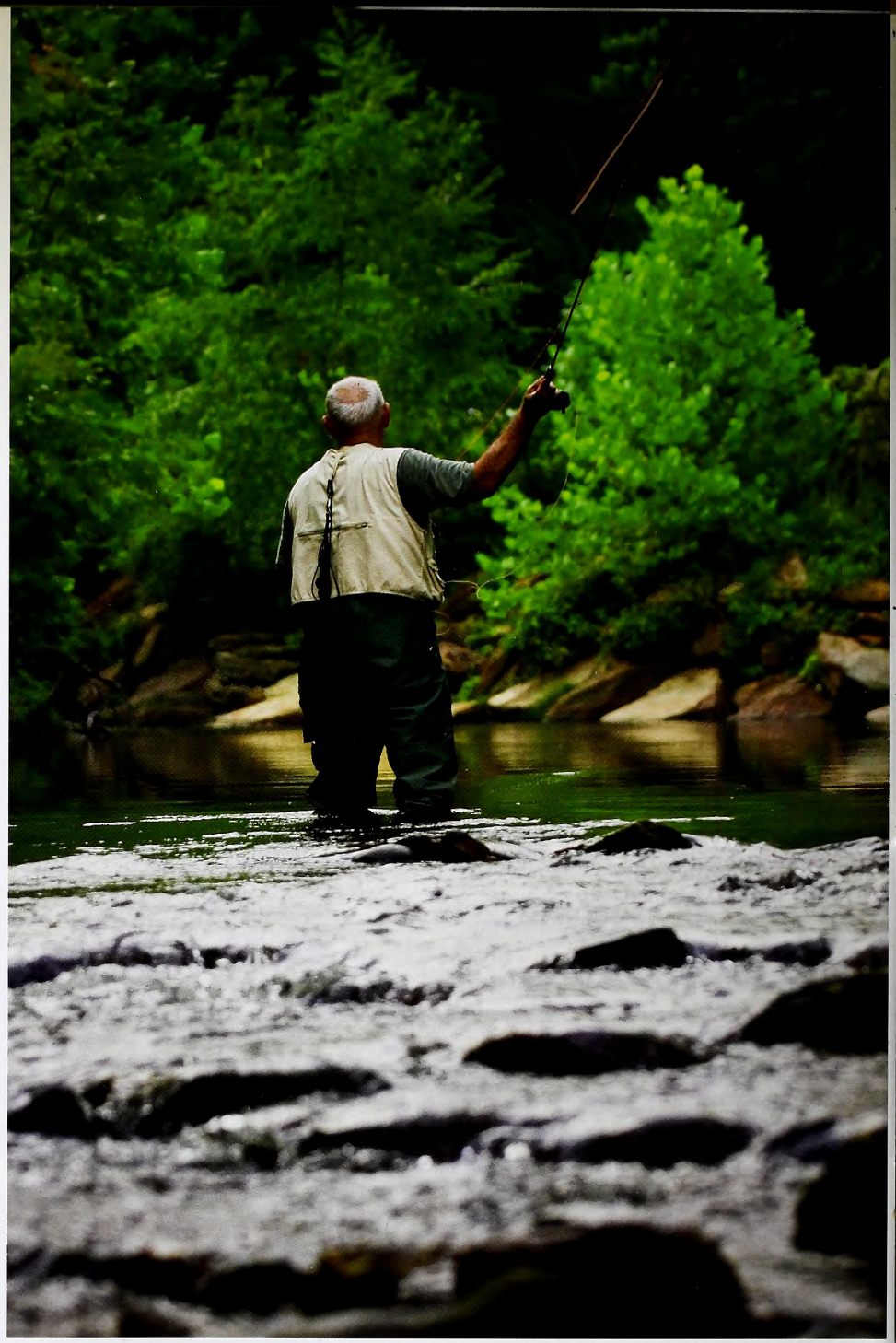
ECONOMIC CONTRIBUTIONS	
Hatchery Supported Waters	$72.7 million
Wild Trout Waters	$55.2 million
Delayed Harvest Waters	$46.5 million

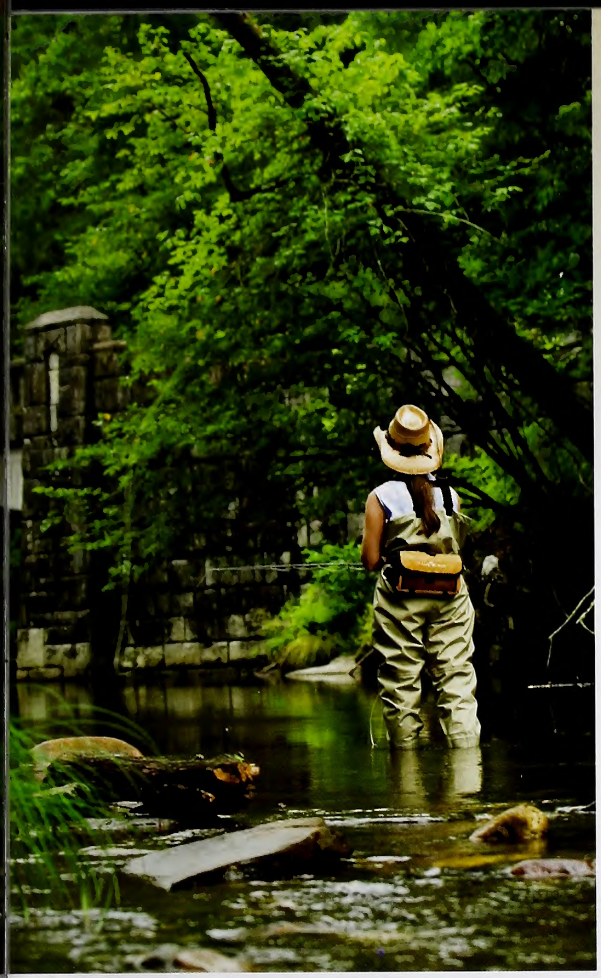
CLASSIFICATION POPULARITY

Percentage of anglers who frequently or occasionally fished these stream classifications:

Hatchery Supported	
Resident	75
Nonresident	68
Wild Trout	
Resident	44
Nonresident	44
Delayed Harvest	
Resident	40
Nonresident	44

To read the full report, visit
www.ncwildlife.org/Fishing/documents/TroutEconomicImpactsFinal_08062009.pdf





Anglers from all sorts of backgrounds and locations have embraced fly-fishing for North Carolina trout. Their dedication shows in the money they spend to pursue trout fishing.

eastern part of the state than it is to buy 5 miles of pristine trout stream," Besler said. For example, the commission's acquisition of the International Paper lands, some 60,000 acres, cost about $66 million dollars, roughly $1,000 an acre (see "The Big Buy," Oct. 2009). Recently, about 700 pristine acres along Wilson Creek that were added to Pisgah Game Land cost about $7 million, 10 times the cost per acre of the IP lands in the Piedmont and Coastal Plain. The purchase, with Natural Heritage Trust Fund and Clean Water Trust Fund monies, provides about 3 1/2 miles of fishing access.

As part of the Delayed Harvest program, the commission stocked 28,000 trout into Wilson Creek.

But access itself need not be so expensive. That's where the economic study comes into play. Besler hopes to use the results of the study to promote trout fishing in western North Carolina towns and counties that have property adjoining trout waters. It's a win-win situation for both local governments and trout anglers. Towns and counties benefit from the economic contributions of anglers, and anglers benefit from increased fishing opportunities. The study documents the economic benefits of trout fishing with many of the trip-related expenditures, including lodging, restaurants, groceries, fuel and bait, occurring locally.

Some towns already have seen the benefits of providing fishing access. Bakersville and Old Fort now have Delayed Harvest water in their towns. At one time the Ararat River in Mt. Airy was degraded to the point that the commission removed it from the Hatchery Supported program. With the river cleaned up and access provided by the city, the location was returned to the program and could soon have a Delayed Harvest section.

Spruce Pine was hit hard by hurricanes Ivan and Frances in 2004, losing businesses and houses along the North Toe River because of flooding. Prevented from rebuilding in the flood plain by FEMA, the town has turned part of those locations into a park with fishing access.

"They can't build back, so they're utilizing the North Toe River as the natural resource to attract people to come to Spruce Pine," Besler said. "Now there's public access to the river and we added this section to the Delayed Harvest program two years ago. There are fly shops opened up in town now. Now that there is permanent access we're working with the town to put in fishing platforms for physically challenged anglers."

Besler said he considered any negatives for a town or county, but has not been able to identify any; he hopes that towns and counties will consider developing trout fishing opportunities. "Take the more rural counties like Alleghany or Ashe, for example. If the county could provide access to a section of stream within 3 miles of West Jefferson, there would be significant economic benefits to West Jefferson."

A different way of looking at access is not the only new idea we might see as the commission's Division of Inland Fisheries prepares its new trout plan, due in 2011. Besler said we should address the recruitment of trout anglers and provide quality fishing experiences.

"We can't have the expectation that everybody will grow up hunting and fishing, that everybody knows where to hunt and fish," Besler said. "If we want to capture new anglers and hold on to our existing ones—and hunters—we've got to treat people like it's the first day they've ever been in North Carolina and it's the first day they've ever fished. If we can accommodate those things, we'll continue to have people who will fish."

And that ties back to access. Anglers want fishing locations well defined. "If you come into town as a visitor and there's a park or greenway to fish, I'd feel comfortable. I'd think, *I could fish there*. That's an impetus behind us in trying to get towns interested in the commission's trout management program. People want a location where they can fish and not worry about violating somebody's private property."

Besler sees great things ahead for trout fishing in North Carolina, as does Robert Curry, chief of the Division of Inland Fisheries, who said, "In addition to the economic contributions, trout fishing provides are intangible benefits of a wholesome outdoor recreational activity that is family-oriented and adds to our quality of life." ◆

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Gary Palmer

Beacons and Birds

Bird strikes at North Carolina's lighthouses began a process that eventually led to the formation of the U.S. Fish and Wildlife Service.

Thunk. Another bird, attracted to the strong, unblinking beam of light, collided headlong into the thick glass. A lighthouse had claimed another victim, one of thousands each year lured, then fatally blinded while migrating along the coast. These events, while unfortunate, nonetheless played a key role in the birth of the federal bureaucracy dedicated to wildlife management.

Lighthouses date to ancient times, most notably the immense Pharos, one of the Seven Wonders of the Ancient World, which stood at the gateway to the Egyptian port of Alexandria. In 1789, the fledgling U.S. Congress created the Lighthouse Establishment—renamed the Lighthouse Service in 1910—as a unit within the Treasury Department. This legislation recognized the economic importance of shipping to the new nation and transferred 12 existing lighthouses from colonial to federal jurisdiction.

Written by
Eric G. Bolen

Illustrated by
Gary Palmer

It also paved the way for the construction of additional lighthouses along the nation's Atlantic coastline, and soon new structures began appearing, among them a lighthouse approved in 1792 for construction at the mouth of the Cape Fear River. After it was completed, however, shoreline erosion made it necessary to build a second lighthouse farther inland using bricks from the original tower. Finished in 1818, this structure is known affectionately as Old Baldy, and is North Carolina's oldest lighthouse still standing, albeit no longer in use. The light on Ocracoke Island, built in 1823, is the state's oldest lighthouse still in operation. By 1852, the United States boasted an inventory of 331 lighthouses.

The toll of birds colliding with lighthouses did not escape the notice of naturalists. Perhaps the first to comment was famed artist John James Audubon, who started writing his "Ornithological Biography" in 1826 to accompany his folios of paintings later published as "Birds of America." In volume 3 Audubon wrote of the Canada goose:

> "Heavy snowstorms also cause them great distress, and in the midst of them some have been known to fly against beacons and lighthouses, dashing their heads against the walls in the middle of the day. In the night they are attracted by the light of these buildings and now and then a whole flock is caught on such occasions."

Henry David Thoreau likewise commented on birds falling to the ground "with their necks broken" after hitting the thick glass surrounding the lantern of the lighthouse on Cape Cod. Thoreau, at once a village crank and literary giant, erred in his postmortem analysis: More than a century later X-rays revealed that birds killed in collisions with windows die of fractured skulls, not broken necks.

But it was a young college student raised in upstate New York who zeroed in on the importance of

lighthouse-bird collisions—not only as a lamentable loss of wildlife, but as a unique source of biological information. Nature, and particularly birds, had intrigued C. (for Clinton) Hart Merriam (1855–1942) throughout his boyhood. In 1872, his accumulated knowledge of ornithology and skill as a taxidermist led to a summertime appointment—at age 16—as a collector for the Hayden Survey in the Yellowstone region. This experience and his 50-page report, published by the U.S. Geological Survey, led to other assignments under the auspices of the Smithsonian Institution. In 1877, while still an undergraduate at Yale and not yet 22, Merriam published a 165-page treatise, "A Review of the Birds of Connecticut, with Remarks on Their Habits." The paper received favorable reviews from leading ornithologists and firmly established his reputation as a serious naturalist. In this work, Merriam wrote:

> "Few people, living away from the coast, have any idea that hundreds of thousands of birds are killed each year, during migrations, by flying against lighthouse towers. [The keeper] of the Faulkner's Island Light, tells me that between two and three hundred dead birds were picked up at the foot of the tower on the morning of May 16th, 1877. During the same night about 300 birds killed themselves against the light at the entrance to New Haven Bay. ... Nearly all our common, and many rare, migrants are found among the dead."

The keeper at Faulkner's Island, Oliver N. Brooks, held the position until 1882, and during his 31 years of service handled so many dead birds that he also became an excellent taxidermist and competent ornithologist. A century later, Faulkner's Island was incorporated into the national system of wildlife refuges in recognition of the colonies of roseate terns and common terns that nested there.

Merriam would go on to medical school, but his practice, although successful, proved no match to his consuming passion for natural history and lasted only six years.

Ornithology was, in fact, gaining such a wide following in scientific circles that formation of a national organization seemed desirable. To that end, a group of prominent ornithologists, Merriam among them, met in New York and founded the American Ornithologists' Union (AOU) in 1883. Although he was one of the younger attendees, Merriam was elected secretary of the new organization and named chairman of the important Committee on Bird Migration.

He quickly set to work gathering data that might reveal some of the characteristics of migration. Among other sources of information, Merriam sought the help of lighthouse keepers, no doubt recalling the contributions of Oliver N. Brooks to his earlier study of birds in Connecticut. The effort produced an outpouring of responses and, often, actual specimens. Lighthouse collisions provided particularly useful data; unlike other observations of migrating birds, lighthouses were a primary source for recording nighttime movements that otherwise went largely undetected. Moreover, with the dead birds in hand, Merriam could confirm the identifications made by the keepers.

At Cape Hatteras, North Carolina's most famous lighthouse and at 208 feet, the tallest in the nation, contributed to the toll of dead birds. The records include 60 to 75 snipe

"frequently found dead at one time" in April and September; also teal, "sometimes as many as 8 in one night." But yellow-rumped warblers (then known as "myrtle birds") easily topped the list, with 200 to 300 sometimes killed in a single night.

In 1876, Spenser Baird visited the Cape Hatteras light on behalf of the Smithsonian Institution and reported seeing thousands of small birds flying in the rays of the light "like myriads of little stars or meteors." He gathered 350 dead warblers on the balcony surrounding the lantern house and another 140 on the ground below. Baird was a practical man as well as a scientist—he considered the warblers "excellent food." Similarly, a thrifty keeper's wife at another station prepared "an abundant Thanksgiving dinner" from brant that had collided with the lighthouse.

The light at Bodie Island proved no less of a hazard for birds. In 1872, and less than 30 days after it began operation, a flock of geese smashed into the lantern, breaking three panes of glass and seriously damaging the expensive Fresnel lens, a crystal beehive of prisms that greatly magnifies the beams of light. The lantern house was thereafter protected with a wire screen that ended the damage but not the collisions.

Merriam soon recognized that he could not handle the volume of data gained from his solicitations of lighthouse keepers and other observers—and the army of cooperators was still increasing. Moreover, he rejected using a card index, which he considered an invention of the Devil, in favor of his own cumbersome methods of storing data. Thus overwhelmed, he advised his colleagues at the 1884 AOU meeting that the project could not continue without additional support.

Accordingly, the AOU authorized Merriam to ask Congress to create a Division of Economic Ornithology within the Department of Agriculture. He subsequently secured a hearing before the House Committee on Agriculture, which rejected the proposal. Fortunately, however, the corresponding committee in the Senate favored the idea, and $5,000 was appropriated to begin the work in 1885. Even so, the House would not agree to the formation of a new unit, insisting that the additional personnel must be housed within the existing Division of Entomology. When asked to recommend a director for the project, the AOU responded with the name of C. Hart Merriam, who was duly appointed. He was not yet 30.

To justify government funding, the new agency's work was couched in economic terms—the mission focused on the importance of avian diets in relation to insects and plants, and the subject of migration was conveniently interpreted to include the geographic distribution of birds, of which some might be harmful to agriculture. Merriam continued to rely on his previous contacts and published a Circular to Keepers of Lights that requested not only information about birds, but also meteorological data and "contemporary and correlative phenomena" such as the dates when the first frog is heard, flowers appear and reptiles emerge from hibernation. Two forms accompanied the circular: one entitled "Birds Observed at Station" and the other "Birds Striking the Light," each designed for the entry of specific data. He also requested that keepers submit the heads and wings of small birds for

identification, noting that the specimens could be sent postage free in official envelopes. The keeper at the Currituck Beach lighthouse immediately asked for bigger packages "as some of the birds were very large."

Some of these forms survive in the National Archives, but many have disappeared into the dust of history. Still, one gains an appreciation for the keepers who faithfully contributed to Merriam's quest for information, which they logged in precise script and at times entertaining spelling. At Currituck Beach, the reports include as many as 500 "rice birds" (bobolinks) killed in a single night along with lesser numbers of willets, snipe, Northern phalaropes, "sea chickens" (dunlins and other sandpipers) and a single woodcock. Yellow-rumped warblers dominated the kills at Cape Lookout, followed by phalaropes, gulls and sparrows, along with at least one kingfisher, killdeer, woodpecker, marsh hen, coot, even a house wren.

Also among the dead were "Mother Cary's chickens" (storm petrels) and a "bee bird" (Eastern kingbird), two of the local names once used for these species in the Carolinas. The light at Bodie Island regularly claimed gulls, bobolinks, brant and other waterfowl, including redheads, black ducks and scaup. On the other hand, the keeper at Ocracoke reported in 1889 that it was rare to see flocks of birds at his station and none had yet killed themselves against the tower.

During this period, Merriam's interests began shifting to mammals, and in 1886, armed with an appropriation now doubled to $10,000, his unit gained independent status as the Division of Economic Ornithology and Mammalogy. The work now included the control of predators and rodents, along with surveys of mammals in 30 states and northern Mexico.

Curiously, while the agency published much of its faunal work with mammals and several taxonomic reviews for such species as pocket gophers, ground squirrels and prairie dogs, relatively little of the data provided by lighthouse keepers was ever analyzed. To the chagrin of Congress, only a few papers specifically advised farmers about the diets and economic importance of birds and mammals. Merriam's personal research by the late

Merriam's Many Interests

C. Hart Merriam was a Renaissance man in the world of American biological study. A physician, zoologist, ornithologist and ethnographer, he developed the "life zones" concept to categorize ecosystem types. Merriam helped found the National Geographic Society, explored the Alaska coastline, taught at Harvard University and studied American Indian tribes.

Shifting his focus from ornithology to mammalogy in 1886, Merriam eventually became the nation's preeminent expert on mammals. He discovered approximately 660 new species of mammals. A number of animal species and subspecies bear Merriam's name, including a wild turkey, a chipmunk, a couple of mice, a gopher, a lizard, a shrew and a squirrel, among others.

In 1910, when he left the Bureau of Biological Survey, he changed gears yet again. Supported completely by a trust fund established by a wealthy friend, Merriam was free to work on research of his choosing for the rest of his days. He disappointed many in the mammalogy community by diving headlong into the ethnology of native peoples in California for the next two decades. The prominent exception was that he continued to study North American brown (grizzly) bears extensively.

Merriam served on National Geographic's board for more than 50 years. A collection of his papers and photographs related to his Indian research is housed at the University of California-Berkeley.

1880s almost entirely focused on the taxonomy of mammals, which included consuming attention to minute differences in the skulls of brown bears (he eventually split the group into dozens of species and subspecies, only a few of which are recognized today).

In 1895, the agency was renamed the Division of Biological Survey, and again in 1905 as the Bureau of Biological Survey. Concurrently, Congress expanded its responsibilities to include hunting regulations in Alaska, enforcement of the Lacey Act, and the government's infant but growing involvement with wildlife management. Somewhat disgruntled with the changing emphasis—he was far more interested in taxonomy and the distribution of animals in relation to climate—Merriam left the bureau in 1910 after serving 25 years as its founding director.

The bureau plugged on sluggishly after Merriam's departure, but it truly flourished in the 1930s under new and vigorous leadership (see "Ducks, Dust, Depression and Ding," Dec. 2007). In 1940, with nearly 17 million acres of federal refuges then under its control, the bureau was combined with the Fish Commission of the Department of Commerce and transferred to the Department of the Interior with the proposed name of "U.S. Wildlife Service." However, in response to fears that fisheries might gain short shrift in the new organization, President Franklin Roosevelt changed the name to U.S. Fish and Wildlife Service.

The agency continues today, responsible for wildlife refuges, fish hatcheries, endangered species, waterfowl and other migratory birds, and a host of other national and international management and regulatory activities. Stated otherwise, from an initial budget of $5,000 in 1885, the agency's budget proposal for 2010 requested a hefty $2.6 billion. As for lighthouses, their beacons were changed from a continuous beam to a system of flashes, for the most part ending further collisions, but not before a cadre of 19th-century keepers had swamped a young physician with their lists of dead birds. ⬘

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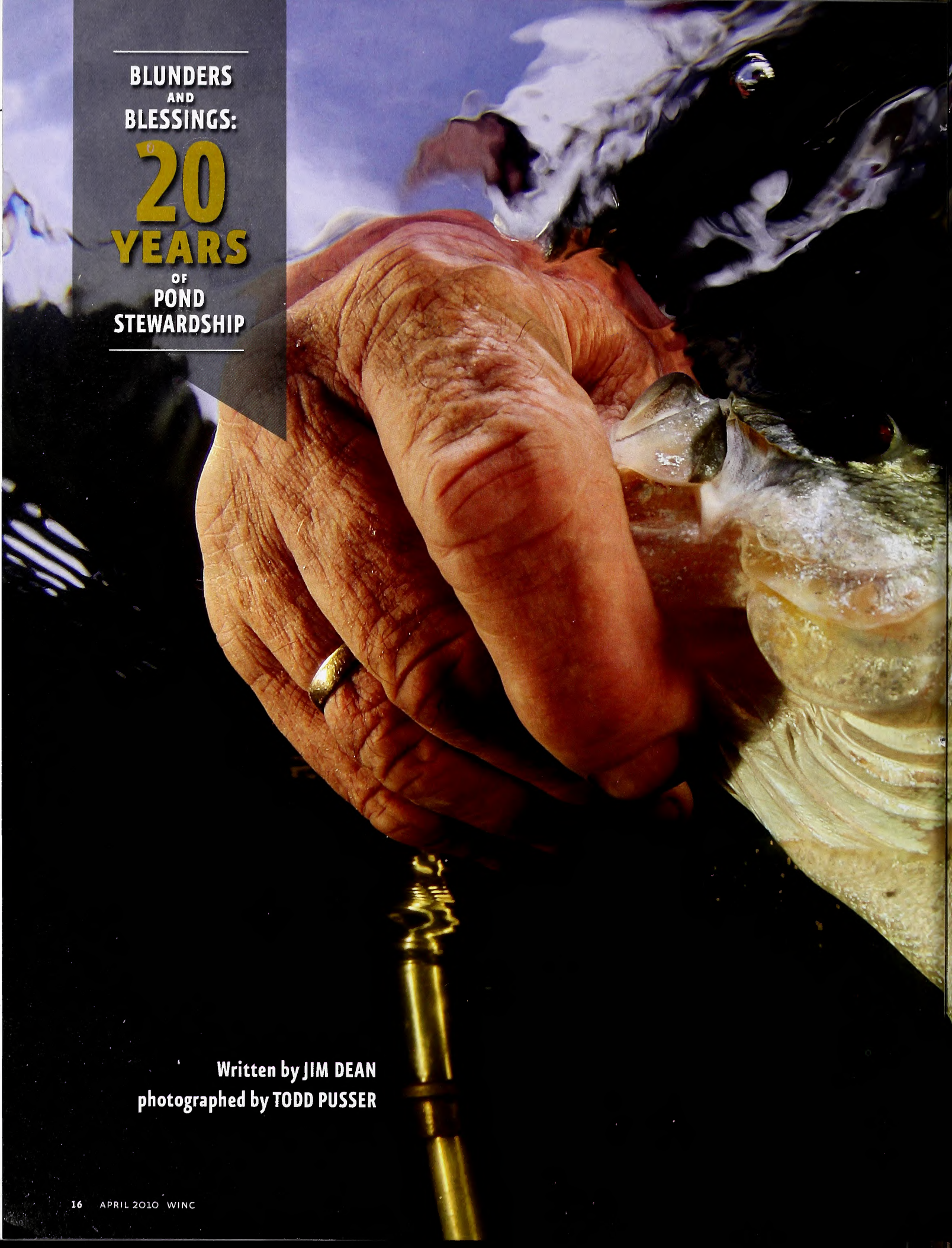
NATURE'S WAYS

How do Bird Feathers Get their Colors?

See Nature's Ways, page 39.

BLUNDERS AND BLESSINGS: 20 YEARS OF POND STEWARDSHIP



Written by JIM DEAN
photographed by TODD PUSSER

PART ONE

DIVING IN

IF YOU DREAM OF CREATING FABULOUS FISHING IN A POND, YOU CAN LEARN FROM YOUR OWN MISTAKES, OR FROM MINE.

I was in my teens when the idea first occurred to me that something might be done to improve the fishing in the ponds at my family's farm in Granville County. My grandfather had built three small irrigation ponds there in the 1950s and, in addition to bass and bluegills, they contained crappies, golden shiners and other species that biologists consider poorly suited for ponds.

Furthermore, in some dry years after the crops were irrigated, the ponds were little more than shallow, murky puddles. As you might expect, most of the bluegills were smallish, and the bass population was only fair. Releasing the occasional bass I caught in hopes of catching it again was the only management tool at my disposal.

Little changed until the mid-1980s when my father turned the operation of the farm over to me (as his father had done years earlier). I had a lot to learn about agriculture, and my discretionary budget was modest, but I found I liked the work. One of the first projects I inherited was completion of a new 2½-acre pond to provide water for several distant fields. I had enjoyed some superb fishing in other farm ponds in the Piedmont that were managed under proven fisheries principles, and I hoped this pond might have the same potential. Perhaps, I thought, even the older ponds might be improved at minimal cost. Surely, within a few years, I'd be catching whopper bass and bluegills.

Needless to say, it has not been that simple. The fishing has waxed and waned far more than I anticipated. In spite of sound professional advice and good intentions, my stewardship has been marked by unforeseen influences mixed with a few magnificent blunders. Even so, the process has been largely pleasurable and has given me an appreciation for the challenges of trying to manipulate pond environments. Fisheries management is a complex science, and I have neither the qualifications nor space to cover more than a few aspects of that vast topic, but at least I may be able to help would-be pond managers avoid some of my mistakes.

Before you decide to tackle any pond project, you should be aware of changes in government programs. At one time, the U.S. Department of Agriculture's Soil Conservation Service (now Natural Resources Conservation Service) offered programs to plan and share the costs of construction of some new ponds. Federal and state fisheries biologists also provided free technical advice, on-site analysis and other assistance, and some of these agencies also provided free fish for stocking.

Unfortunately, federal and state agencies no longer have the resources to provide full-service assistance to private waters, and they have placed their emphasis on managing public waters. Technical advice and some on-site evaluation are still available from the N.C. Cooperative Extension Service, the

BEGIN BY GETTING TRAINED GOVERNMENT OR PRIVATE PROFESSIONALS TO TEST YOUR WATER, EVALUATE YOUR SITUATION, AND OFFER BIOLOGICALLY SOUND RECOMMENDATIONS.

U.S. FISH & WILDLIFE/E. ENGBRETSON

Natural Resources Conservation Service and, to a limited extent, the N.C. Wildlife Resources Commission, but some commercial pond and lake management companies have stepped in to provide services on private waters (sources of advice, assistance for building and managing ponds and lists and hatcheries which provide fish will appear with the third and final part of this series).

If you are planning to build a new pond or hoping to improve the fishing in an older pond, it is vitally important to begin by getting trained government or private professionals to test your water, evaluate your situation, and offer biologically sound recommendations. One advantage of the small warm-water ponds typically found on farms throughout the Piedmont and Coastal Plain is that they often respond favorably to a variety of management tactics that are impossible to apply on large bodies of public water. But unless you can afford to hire pond management professionals to do all the work, you will have to do much of it yourself. For what it's worth, my family has benefited from the technical advice still offered by government agencies, and we've also had good results working with private stocking and pond management companies.

Even so, mistakes are still possible, and the first one I encountered involved stocking. Shortly after construction was completed on our new pond, I contracted with a private company (no longer in business) to provide our initial fish stocking. Fisheries biologists had recommended that only largemouth bass, bluegills, shellcrackers (redear sunfish) and channel catfish be stocked. However, a few months after the tiny fingerlings were

Planting spatterdock can be a bad move in pond management if the aquatic plant brings along undesirable exotic plants. Grass carp can be beneficial in controlling algae, while beavers can weaken dams when they build their lodges.

stocked, I discovered that the delivery had included several species I didn't want, including crappies and sunfish hybrids.

Most new ponds are stocked with fry or small fingerlings, and even reliable contractors may not know, nor can they always control, what gets into their stock-raising ponds. One way to reduce this risk is to stock with adult fish that can be more easily identified before they're irretrievably dumped in. It's more expensive initially—and impractical for large public waters—but arguably worth considering for ponds. This approach will also get you fishing a year or two quicker.

Even before we had the problems with unwanted species, I made a big mistake while our newest pond was being constructed. I had this notion that if we left some standing timber in the upper end of the pond, it would help attract wood ducks and give the pond "character." I was warned that this might lead to trouble, and sure enough, within a few years, those trees died and began to fall, creating a hazard for fishermen and choking the upper end of the pond with fallen timber. Not only did half the pond become impassible, this hampered weed control and other management efforts.

Biologists caution against installing too much cover where fish can hide in a new pond. Indeed, most of the outstanding farm ponds I've fished over the years have had limited cover. Such ponds may not look "fishy," but looks can be deceiving, and you can always add a few fish "hides" or similar cover later. Of the four ponds on our farm, the pond that is essentially a big bowl lying in an open, abandoned pasture is the least appealing visually, but weed control and management are easier, it has beneficial exposure to the sun, and it typically provides the best fishing year-in and year-out.

One of my biggest blunders was a self-inflicted wound that will never heal. I grew up with fond memories of fishing around beds of lily pads in eastern blackwater rivers. On an impulse, I collected a few tubers of a large type of lily called spatterdock (it has big leaves and a round yellow bloom nearly the size of a golf ball), and put them in one of our ponds. Spatterdock lilies are pretty, fish love their shade, and they don't prosper in deep water. They are also fairly easily controlled with spray, but bringing them to our ponds was a mistake compounded by the fact that I also may have unwittingly introduced other far more troublesome aquatic plants at the same time.

The most serious of these is a plant, originally from Asia, known as watershield (it has leaves that look like oblong water lilies about the size of a silver dollar). Watershield leaves lie flat and thick on the water over long, thin reddish stems, and the plant can prosper in much deeper water, literally overwhelming a pond. You can't drag even a weedless plastic worm through it, and it will instantly clog an electric motor. In one of our ponds, it now takes fairly expensive herbicide treatment applied every year or so to keep it temporarily under control, and we will never be entirely rid of it. Indeed, it is already spreading to the other ponds. The lesson is clear—don't import trouble.

Sooner or later, every pond manager faces problems with undesirable weeds and algae. Most can be controlled by a variety of effective chemicals that do not harm fish, but just as with terrestrial weeds, knowing what weed species you are dealing with is essential for success. Fisheries biologists, your county extension agent or commercial pond managers can assist with plant identification and recommend the most appropriate treatment. Most emergent weeds (poking above the water's surface) can be controlled by spraying with chemicals available at farm supply stores, while other submersed weeds require more expensive application into the water.

MOST NEW PONDS ARE STOCKED WITH FRY OR SMALL FINGERLINGS, AND EVEN RELIABLE CONTRACTORS MAY NOT KNOW, NOR CAN THEY ALWAYS CONTROL, WHAT GETS INTO THEIR STOCK-RAISING PONDS.

Grass carp are sometimes used to help control certain weeds. However, Keith Ashley, fisheries biologist with the N.C. Wildlife Resources Commission, says that his agency normally recommends the use of an approved aquatic herbicide for most submerged weeds and some algae, and does not normally recommend grass carp unless algae is the dominant plant in the pond. Grass carp can help control certain forms of algae, and many private pond managers recommend (and supply) grass carp for this purpose. My family has had reasonably good success with these aquatic vegetarians in one of our smaller algae-choked ponds.

Early on, I was also told that because woods surrounded our new pond, I could anticipate dealing with some unwelcome guests who would be thrilled to find a home conveniently surrounded by food. Beavers soon moved in, gnawed down valuable timber and dammed the spillway, raising the water level and threatening our dam. They also weakened the dam by tunneling into it to build lodges. Beavers may prefer woodland ponds, but they have become so numerous throughout North Carolina that any pond is likely to attract them, and they soon inhabited all of our farm's ponds.

Some counties have had beaver control programs to assist pond owners. Ask your county Cooperative Extension agent since some of these programs may no longer be funded during the current economic crisis (see "A Good Problem to Have," Aug. 2009). If your county has no such program, you'll have to pay a private contractor to periodically trap beavers.

Although beaver sterilization has been proposed to control their population, the effectiveness of this method remains unproven, and the ways to accomplish it are untested and unfunded (and a sterile beaver would still have teeth). Don't waste time and money trying to shoot or outwit persistent beavers. Periodic trapping is the only workable control found so far, albeit temporary.

One big decision pond owners confront is whether to fertilize, and this issue will be covered in greater detail later in this series. True, the appropriate fertilizer can enhance the number of miniscule critters that small fish eat, and this increased carrying capacity works its way up the food chain to enhance the numbers and size of all your fish. But maintaining a fertilized pond takes a lot of sustained work, and the benefits are lost if you drop the ball.

"Many pond owners find it more practical not to fertilize, and that's what we usually recommend," says Ashley. "You can still have decent fishing, especially if you apply other sound management practices."

In the second part of this series, we'll look at some of those practices, and I'll reveal a surprising discovery we made when we decided to drain two of our ponds. Then, in Part III, we'll get to the meat of the subject—specific steps you can take to build or restore a pond, and where to get good advice and assistance with your project. ◆

Jim Dean is the former editor of Wildlife in North Carolina *and is its longtime Our Natural Heritage columnist.*

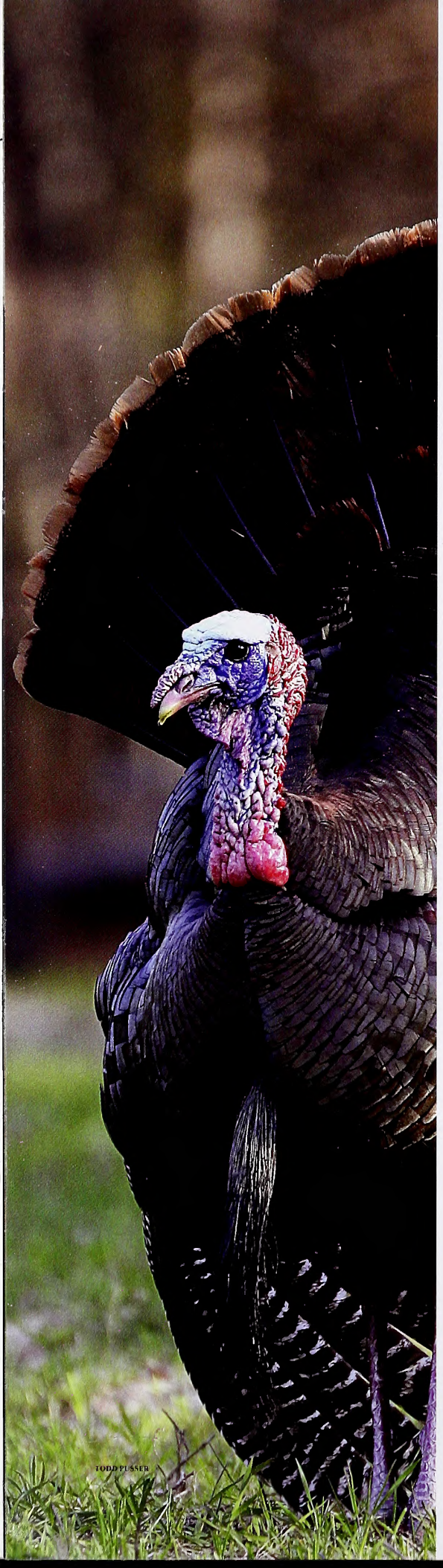
HOW TO TACKLE A

TOUGH TURKEY

TODD PUSSER

TURKEY HUNTING SUCCESS COMES MORE READILY ON MATURE, CALL-SHY BIRDS WHEN YOU GET TO KNOW THE GOBBLER PERSONALLY.

WRITTEN BY MARTY SHAFFNER


TODD PLUSSER

Eddie Barr walked out his back door in the pitch black of the early morning and was greeted by the falling of a light misty rain. Perfect, he thought. The damp woods would make it easier to sneak in close to the gobbler that would be roosted close to at least a couple of hens. He had watched this tom off and on throughout the season, and several mornings and evenings he had seen the tom strutting in the middle of a large field with a varying number of hens as he hunted other birds.

Eddie started out very early—he wanted to set up close to the tree where the gobbler was roosted. The darkness of the early morning, cloud cover and heavy leaves on the late season hardwood trees would aid in his being undetected. He reached the area where he wanted to be and there was still no hint of daylight.

After about 30 minutes of sitting in the dark forest listening to the dropping of water from the tree branches and calling of whip-poor-wills, the forest echoed with the ringing of a gobble out from the limbs of a nearby white pine tree. A smile came across Eddie's face: The bird was roosted where he thought it would be. He made no calls to the bird while it was in the tree, something that often makes a tom stay on the roost longer.

The mature tom gobbled a couple of more times. Eddie heard the light yelping and clucking of several hens roosted not far from him, but nearer to the field where he had seen the small flock feeding in the mornings. His setup was perfect, he was between the gobbler and the hens, and he knew they wanted to head toward the field. The gobbler should naturally pass Eddie on its way to the field.

As daylight broke, he still had made no calls. A few minutes later, he heard wings beating. Only seconds later, the tom landed about 50 yards in front of him. Eddie already had his shotgun shouldered. He slightly moved the gun barrel to cover the bird's neck. Only then did he make a couple of light yelps. The bird fanned out and strutted to within 20 yards, stopped, broke strut and gobbled. It was his last gobble.

The sound of the 12-gauge magnum was still echoing through the hollows of the mountains as Eddie heard the wing beats of the hens flying toward the field where he had seen them the evening before.

QUALITY TIME This story sounds like an easy hunt, but one mistake would probably have left the hunter scratching his head, wondering what went wrong. Eddie Barr lives in Devotion, a small community near the Surry-Alleghany county line. He is a seasoned turkey hunter who hunts in two or three states every year. Over 100 gobblers have fallen to his gun, and he has called up numerous others for his son and friends.

That type of turkey hunting success does not come by accident and good luck. Eddie lives, breathes and literally eats turkey. A true student of turkey hunting, over the years he has developed the "mojo" that only people who pursue a sport to its fullest ever obtain. He has developed a number of skills and techniques that help him harvest tough gobblers, but his best advice is simple—get to know him.

Every tough old bird has a unique personality that you can—with some often unconventional tactics—exploit to your advantage. The loudmouthed kamikaze birds die as jakes or 2-year-olds. Others become hunter-savvy birds 3 years and older, many with harems of hens. They aren't going to run to every lonesome hen yelp they hear. It usually requires some thought to devise a game plan that will bring one of these birds in your gun sights.

PRESEASON SCOUTING The time to start is scouting before the season ever opens. If you have a good lease or permission to hunt a large block of land with heavy turkey populations and are content to harvest a 2-year-old bird or a jake, then scouting is not as critical to success. Sometimes, 2-year-olds without hens are hard to find and the only vocal birds are the ones with hens. That is when your preseason scouting really shines.

Start out by being on a high point of terrain at least 30 minutes before daylight several weeks before the season opens to listen for gobblers sounding off on the roost. Try to go several mornings in a row. Some mornings toms just don't gobble, and some mornings it seems like every turkey in the woods is gobbling. Never, and I repeat never, use a turkey call in the preseason. It serves only to educate turkeys.

Let's say you yelp a couple of times and then hear wings beating. Wham! A gobbler lands 40 yards in front of you. He is either spooked by seeing you or just struts around for a few minutes and leaves. Either way, he has committed to coming in and found no hen—not a good confidence builder for the gobbler. It's a lesson that could make him harder to hunt.

In today's world of high hunter pressure and educated turkeys, less is usually better. After hearing a bird from the roost, hang around and see if he gobbles after flying down so you can get a feel for where he is headed. This will help pattern the bird. Also listen for hens to try and see if they usually roost with the gobbler or a short distance away from him. Both of these things will help you develop a plan of attack.

EVERY TOUGH OLD BIRD HAS A UNIQUE PERSONALITY THAT YOU CAN — WITH SOME OFTEN UNCONVENTIONAL TACTICS — EXPLOIT TO YOUR ADVANTAGE.

LOCATION, LOCATION, LOCATION Just like in real estate, when it comes to where you set up to call the gobbler in, it's all about your location. Sometimes a few yards one way or another can make the difference between success and failure. The perfect place is a natural travel lane where you (and the gobbler) can see only about 30 yards. It should be located between the gobbler and his hens. Mature toms know that if they can see 70 yards and they don't see a hen where the calling was coming from, something is wrong.

LESS IS BETTER With tough toms, most of the time soft calling done sparingly is often better than the boisterous calling most hunters do. This is the undoing of a lot of hunters, myself included. I love to call and I love to hear turkeys gobble, but when dealing with older, mature, call-wise birds, use your call sparingly.

In the opening vignette of this article, I mentioned that the hunter made no calls while the tom was on the roost. Mature gobblers often stay on the roost and wait for hens that are roosted nearby to show up before flying down. If you are set up close to the roosted gobbler and call, he figures you should come over to him, so he stays in the tree waiting for the hen to show up.

I learned this early in my turkey hunting career by calling to a couple of gobblers roosted together that stayed in the tree for what seemed like forever. Finally I moved about 45 degrees to their left and slightly away from them, and one of the gobblers finally flew down and came in. I had unknowingly made it seem as the hen was leaving. It was more than the gobbler could stand.

IN A FIELD OF THEIR OWN "Field birds" are never easy. Gobblers that spend most of their time in fields or pastures bring about their own set of challenges and some require unique tactics. The tom at the beginning of this article was a field bird, but Eddie had gotten to know this gobbler by scouting throughout the season. By doing so from a distance and not pressuring him, he was developing a plan that was tailored to the habits of this particular gobbler.

RUSSELL GRAVES

TODD PUSSER

PHOTOS BY RUSSELL GRAVES

WHEN DEALING WITH OLDER EDUCATED TOMS, SOME OF THE BEST ADVICE IS TO THINK OUTSIDE THE BOX. DO SOMETHING DIFFERENT FROM WHAT EVERYONE ELSE IS DOING.

Trying to call turkeys to places they are not traveling to or normally use will often produce gobblers that hang up out of range and create call-shy birds. Eddie was able to pattern this bird and set up between him and the field along the bird's normal path to the field. It sounds simple, but setting up anywhere outside of the tom's normal travel corridor to the field would not have worked. Some field birds fly directly from their roost into the middle of a field to strut and gather hens, and some will stay all day until going to roost. These toms are the toughest gobblers to harvest.

Some can be harvested by patterning them to see where and at what time of the day they exit the field. If a pattern of movement can be established, you can set up near where they exit the field. A setup 20 to 30 yards inside the woods from the field edge is usually best, but it depends upon the terrain. Call sparingly with these birds, because many have been pounded with aggressive calling by hunters trying to call them out of the field.

I'm not a big fan of decoys, but sometimes decoys can be an asset to hunting field birds. Sometimes you can slip in while it is still dark and set up a decoy a few yards from the field's edge. After the gobbler flies down into the field, you can call him into range but if other hens fly down to him or come to him while he is strutting, your odds of calling him in get slimmer with every hen he gathers. Why would he want to go all the way over to the field's edge to one lone hen when he can stay in the safety of the middle of the field with several hens coming to him? Six hens in the hand are worth more than one at the field's edge.

Field birds are gobblers that strut, gather hens and live almost entirely in a field, except for roosting. Eddie told me about an extreme case from the Low Country plantations of South Carolina. One gobbler would fly from his roost into the middle of a 100-acre field, where he would strut, gather his hens and stay until flying to his roost. "That bird is unkillable," I told Eddie, who replied, "I killed him."

"How?" I asked. Eddie answered, "If you can't call 'em, crawl 'em." He would start crawling while still in the woods whenever the gobbler wasn't looking—strutting with his back to him or feeding with his head down in the grass, for example. This took several hours to accomplish but was successful. Eddie "crawled up" several old call-shy toms in

South Carolina over the years. It should work in our state as well.

One important caveat: This tactic could potentially be dangerous if you don't know who is hunting nearby. It's definitely an extreme tactic for what is otherwise an impossible situation.

OUTSIDE THE BOX When dealing with older educated toms, some of the best advice is to think outside the box. Do something different from what everyone else is doing. Call sparingly with a slate, box or wingbone call. Many hunters in the woods are calling aggressively with a diaphragm call, thinking that louder calling and plenty of it will get that gobbler fired up to come running. Older birds are often conditioned to that type of calling and they're not going to come running out to a loudmouthed hen.

Which brings us to the next piece of the puzzle: the location of your setup. Being in the right place is more important than any call you could ever make. Think about it—if you are set up in the right place, you won't even have to make a call.

How do you know where the right place is? Scouting before and during the season are essential to knowing where to set up. If you don't have time for preseason scouting, you can get to know a bird while hunting him—as long as you don't get too aggressive and spook him. I have harvested more than one bird after hunting it several mornings.

Make written or mental notes of everything the gobbler does, and change your tactics accordingly. If you try to call a tom in for two mornings and he goes out the same ridge both mornings after flying down, you need to be set up on that ridge on the third morning. It sounds simple, but sometimes hunters overlook the obvious.

Don't be afraid to try something different. If something comes to mind that you think might work, give it a try as long as it is safe. Hunting educated gobblers is a thinker's game.

Lastly, don't be too aggressive when hunting these tough old birds. You can always get more aggressive on subsequent hunts. Take your time and get to know the tom you're targeting. ◆

Marty Shaffner is an Elkin fishing guide with Tri-State Angler Guide service and a veteran turkey hunter. He is a regular contributor to WINC.

RUSSELL GRAVES

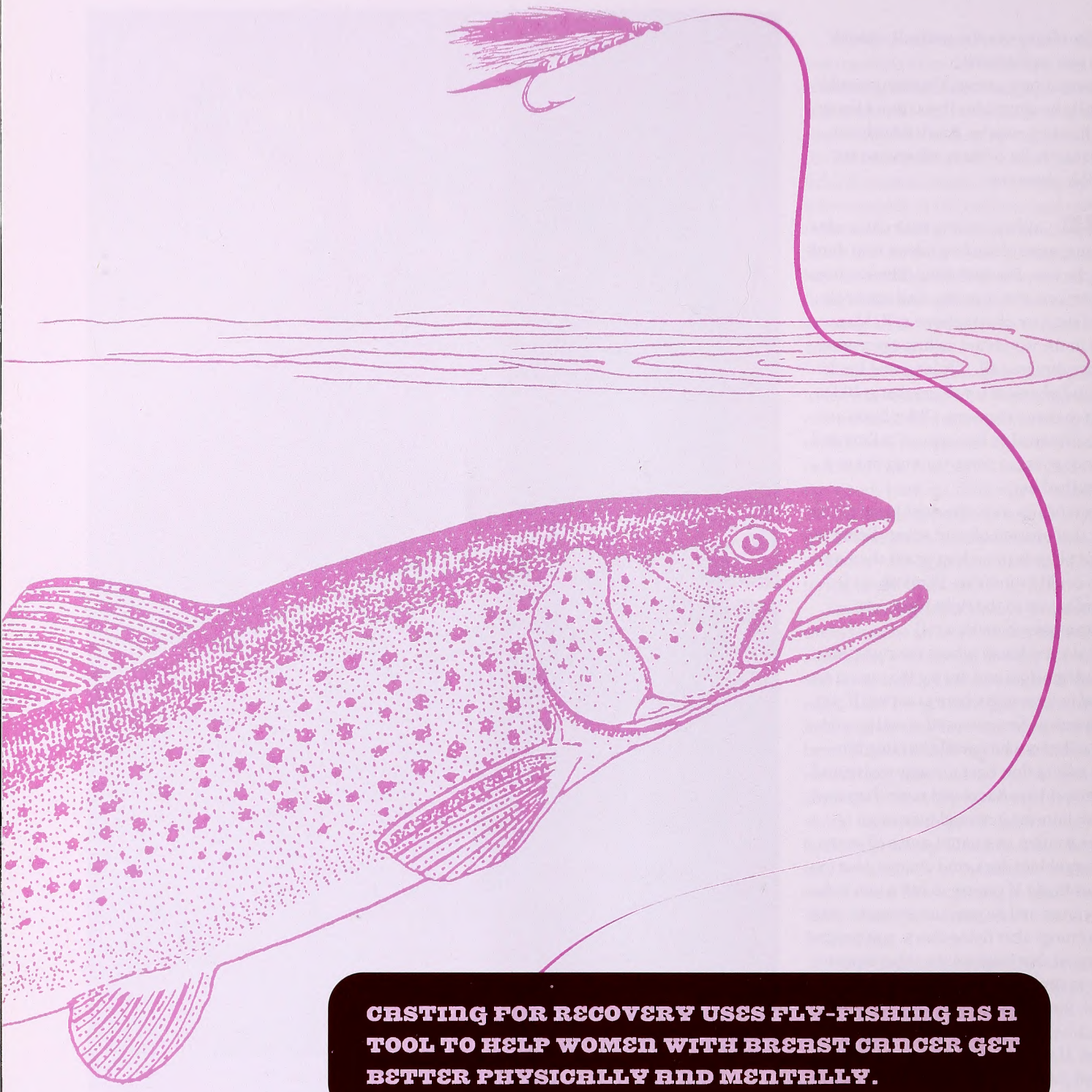
REVERSING NATURE?

Turkey hunter extraordinaire Eddie Barr almost never calls to a bird on the roost unless it is a long ways off. Eddie told of a learning experience early in his turkey hunting career. He had slipped in and set up fairly close to a roosted bird. The tom gobbled, and Eddie gave a few light yelps. The turkey gobbled back.

A few minutes later he gave a few more light yelps and a couple of clucks. The tom gobbled several times. This went on several times so he thought, I'll set it up a notch and get the bird fired up. He'll fly down and come on in. Eddie gave a fly-down cackle that ended with a series of yelps, and the tom gobbled feverishly. He waited a few minutes for the bird to fly down but he never did.

The gobbler was waiting for the hen that he believed had just flown down to show up at his tree. Eddie called again after a few minutes, and again the tom gobbled several times. This went on and on, and at 11 a.m., the gobbler was still sitting on the roost.

Eventually, the bird figured something wasn't right, and it flew down in the opposite direction to look for a hen that wouldn't play so hard to get. We forget that in nature the hens come to the tom, not the other way around. By calling the gobbler to us, Eddie believes we are trying to reverse nature.



CASTING FOR RECOVERY USES FLY-FISHING AS A TOOL TO HELP WOMEN WITH BREAST CANCER GET BETTER PHYSICALLY AND MENTALLY.

Reel Healing

When my wife of 30 years was diagnosed with breast cancer in September of 2008, we were both devastated. After Elaine's chemo treatment commenced and we began to hope for a recovery, we started thinking of goals for her to meet. One of those was for us to be able to attend the annual August session of Casting for Recovery held at Lake Logan Episcopal Center (there is also a session each May). Starr Nolan, who operates Brookside Guides in nearby Asheville, is the volunteer coordinator and retreat leader of a Casting for Recovery program that serves North and South Carolina women. Ironically, before Elaine ever received her diagnosis, Nolan had enthusiastically described the program and suggested that we might want to come on the Sunday media day.

Begun in 1996, Casting for Recovery (CFR) is a national nonprofit support and educational program for women who have or have had breast cancer. CFR offers 44 retreats in 30 states across the country, depending on many volunteers and organizations for assistance. The getaways employ counseling, educational services and fly-fishing to aid in mental and physical healing. And, very importantly, the program provides the opportunity for women to make new friends and have fun.

Written & Photographed by Bruce Ingram

Top: Pam Baker pulls on her waders to fly-fish the Pigeon River. Bottom: Participants and guides meet before fishing to go over strategy—and maybe share a laugh. Previous page, top: Guide Joyce Shepherd, right, schools Baker in fly-casting. Previous page, bottom: Guide Dale Klug shows Barb Kellner what a stonefly nymph looks like. Opposite page: Guide Brett Salter with Courtney Coggins, and the whole crew of participants from last August's CFR event.

Amazingly and wonderfully, these retreats are free. Participants receive counseling and medical information, and trained volunteers teach the basics of fly-fishing and entomology. Kate Fox, director of communications for the organization, says that about three women apply for every available slot and that CFR continues to seek more funds so it can serve more women.

Fox says that 40 percent of the referrals come from the medical community. The idea is that many women in North Carolina and elsewhere who might not necessarily attend a traditional support group—or who do not have access to one—enjoy the unique opportunity a CFR retreat offers. CFR features some 1,500 volunteers in its database, one of whom, of course, is Nolan.

"Starr is a longtime volunteer and provides a very strong team in North Carolina," says Fox. "She does an exceptional job, as do her volunteers."

In fact, many volunteers are former participants, who, having experienced the benefits of CFR in their own lives, want to give something back such as helping at a retreat, doing outreach at local hospitals, or being involved in any number of ways. National sponsors include The Hartford and Under Armour. At the end of 2009, close to 4,000 women had participated in 311 Casting for Recovery retreat programs.

I had to ask Fox why fly-fishing was chosen as part of the recovery experience.

"The inspiration came in 1996 when a woman's breast surgeon, who herself was a fly-fisher, realized that the activity would be a good way to encourage mental and physical healing," says Fox. "Fly-fishing's gentle casting techniques provide therapeutic motions for joint and soft-tissue stretching in areas affected by radiation or surgery. These are similar to the motion of exercises that doctors prescribe for recovery."

Additionally, the rhythm of casting the line and being in a natural setting relieves everyday stress and provides a sense of calm. Participants also benefit from the balance between the fly-fishing and counseling curriculum, which enables dealing with their cancer, but they still receive support from medical and psychological professionals who are present to assist in a group setting. In short, women learn new outdoor skills in a beautiful setting and receive physical therapy at the same time.

Starr Nolan has been conducting retreats since 2002 and explains that her two avocations/passions (licensed clinical social worker and fly-fishing guide) were natural reasons for her to become initially involved with CFR. Of course, the most significant aspect of that involvement has been interacting with the participants.

"I think the most meaningful moment for my staff and me was witnessing the courage of Kathy [last name withheld] in 2006," Nolan recalls. "Her cancer had metastasized into her brain, and the person who dropped Kathy off did not expect her to be alive when the retreat ended. But Kathy was determined to learn how to fly-fish and received her instructions while sitting in a chair.

"On Sunday during our fishing time, Kathy, while using a walker, caught three trout. She also won the fly rod that was raffled off, and every woman present took turns fishing with that rod which Kathy later gave away to a friend at the retreat. A few weeks later, Kathy was gone. She was one of the most amazing, inspirational people I have ever met."

The retreat was beautiful. Thank you. I have a new pep in my step and a new hobby. I like fly-fishing. I am hooked. I am so very grateful that I was able to participate ... I think the best thing for me was the yearning to do more nature related adventures ... it was so inspiring to do something I had never even imagined doing.

Another wonderful aspect of Nolan and her 11-person volunteer staff's involvement are the annual reunions. More than 200 women are now alumnae, and many come every year. Nolan also emphasizes the special dedication of her volunteers.

"The 11 staff members who have staffed these retreats twice a year since 2002 are all volunteers who cover their own transportation costs and their lodging if they choose to arrive early," she says. "In addition, they

COURTESY OF STARR NOLAN

COURTESY OF STARR NOLAN

donate food and other items to help cover some of the actual retreat expenses.

"And they attend our annual reunion in November and pay all of their own expenses. They choose to do this because they believe strongly in the CFR program and its ability to help women grow and heal. Also, several staff members make significant financial contributions and/or belong to clubs that provide significant support for CFR NC/SC every year.

"The thousands of hours of volunteer time that I have devoted to CFR have come back to me in so many positive ways that I couldn't begin to count. Volunteer and alumnae devotion to the program provide the energy that keeps CFR moving onward and upward every year."

Johnny Keesee, executive director for the Lake Logan Episcopal Center, relates that the annual CFR events are an important part of his organization's overall thrust.

"The philosophy of Casting for Recovery is consistent with our philosophy at Lake Logan," he says. "We want to reach out and serve others, as does Casting for Recovery. It's really neat for our staff to work with the ladies that come here.

"We also enjoy watching the participants learn how to catch fish, gain confidence in themselves, and become comfortable with their new support group."

Our Day at Lake Logan

Elaine and I arrived on the Sunday media day just as participants were filing in for breakfast. One of the first people I encountered was Joyce Shepherd, a legal secretary from Charlotte, who is a volunteer guide for the participants.

"I volunteered because I knew that Starr and her group needed some help," Shepherd told me. "Plus, I think it's a wonderful idea

SCHEDULE

FOR A TYPICAL 2½-DAY CASTING FOR RECOVERY RETREAT

Friday

3:00 Participant arrival, check-in and receive gear – snacks and beverages provided
5:30 Introductions and an overview of the program
6:30 Dinner followed by group gathering

Saturday

8:00 A.M. Breakfast
9:15 Overview of fly-fishing equipment and knot tying instruction and practice
10:30 Break – snacks and beverages provided
10:45 Warm-up exercises followed by introductory casting demonstration and practice
12:00 Lunch followed by discussion session on the physical effects of breast cancer (led by the medical facilitator)
1:30 Free time
3:00 Advanced casting demonstration and more practice casting
4:00 Break – snacks and beverages provided
4:15 Presentation on "What Fish Eat" and demonstration of fly-fishing methods

Sunday

7:30 A.M. Nondenominational spiritual gathering
8:00 Breakfast
9:00 Guided catch-and-release fly-fishing – media time
1:00 Lunch
2:00 Graduation
3:00 Participant departure

COURTESY OF STARR NOLAN

FOR MORE INFORMATION

Starr Nolan, Coordinator: (828) 215-4234. Nolan and her volunteers must raise some $20,000 annually to put on their CFR event, which serves residents of both North and South Carolina. Donations are appreciated. In 2010, retreats will be held on May 7–9 and Aug. 27–29.

Casting for Recovery: www.castingforrecovery.org, 1-888-553-3500

Donations: All CFR sessions are self-funded. Specify that your donation go to the NC/SC program if you wish.

for women to build their muscle strength through fly-casting.

Next, I met Pittsboro's Pam Baker, who was diagnosed with breast cancer in June of 2002.

"I'm not a fan of support groups and I grew up in an era when women didn't fish, so at first I didn't see how Casting for Recovery could possibly be something that would benefit me," Baker said. "But the more I heard about CFR, the more I was intrigued. My husband, our kids, our church group, and friends were all so supportive about my diagnosis, yet I felt I needed something more.

"What I found that I needed was being around women who had experienced what I had and survived. I also decided that it might be fun to learn how to fish. So I started applying in 2004 to CFR, hoping that my name would be one of the ones that were drawn. When I found out my name had been drawn, I felt like I had won the lottery."

After breakfast, Lewisville's Margaret Williams, the volunteer hospitality coordinator for CFR, held a drawing for trout flies. In keeping with the joyful spirit of the event, all 14 of the ladies present "won" a fly box. Then it was time for each of the participants to don their waders, meet their guides (each participant has her own "river helper," an experienced angler who gives one-on-one instruction), pose for a group picture, and head for the West Fork of the Pigeon River, which feeds Lake Logan. The former is a trout fishery while the latter offers a two-story fishery of largemouth and smallmouth bass, white and yellow perch, sunfish and trout.

Shepherd and Baker happened to be paired with each other, and I rode with them to the West Fork, which had been stocked with trout the day before. Once there, Shepherd patiently explained to Baker the rudiments of casting to trout, where they typically hold, and which fly patterns to select. Upstream and downstream from Joyce and Pam's position, I could see other guides and participants undergoing the same type of interaction.

I visited with Barb Kellner of Asheville and Dale Klug, a Trout Unlimited member from Arden. Klug had just found a stonefly clinging to a rock and explained to Kellner how this insect is an important part of a trout's diet. He helped Kellner select a stonefly nymph from her new tackle box and demonstrated how to work a subsurface pattern through a run. Barb quickly learned how to do so. I asked her what had been the highlights of her weekend.

It has been a wonderful experience meeting other breast cancer survivors and being with people who understand our feelings. I leave here with a new joy and zest for life.

"Definitely the courage of the women I've met here," Kellner told me. "I've made so many friends who have helped show me the path through and beyond cancer. I waited for two years to be drawn — this is my lucky weekend. Of course, one of the highpoints has to be fishing with Dale."

Next, I walked over to where Courtney Coggins of Cashiers and Brett Salter of Asheville were fishing. Coggins has to be one of the most joyful anglers I have ever encountered. In turn giggling when she cast her fly into a tree, chortling when she snagged it on a rock, and then laughing uproariously when she hooked and lost a trout, this was an individual having a grand time.

Finally, it was time for everyone to return to the dining hall for lunch. There I had an opportunity to converse with Margaret Williams who was diagnosed with breast cancer in 2001, was one of the original CFR participants in 2002, and thereafter became a volunteer.

"After I finished my chemo, I kept receiving letters from my hospital informing me of the support groups I could join," Williams told me. "I envisioned dark rooms, gray folding chairs, and women crying. I didn't want that.

"Then a good friend of mine from Seattle, Wash., sent me a newspaper clipping about the CFR program out there. And I thought, *That's how I want to live my recovery.* I could learn a skill — fly-fishing — that I could enjoy the rest of my life, and I could pass on that skill to my children."

Then Williams told me how supportive her husband had been throughout the period from the time she had been initially diagnosed through her years as a volunteer, and she also talked about how difficult the whole experience had been on him. Hearing that, I suddenly recalled how Pam Baker had earlier that day told me about how, when she was first

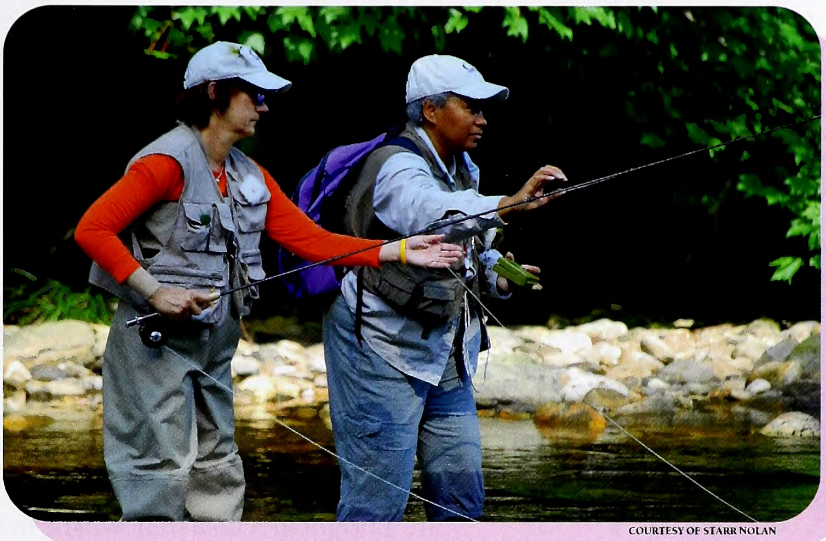
diagnosed, she had come upon her husband who was sobbing alone in the night. And then I burst into tears—the first time I had cried since Elaine was diagnosed with breast cancer.

Williams reached out to comfort me. At the same time, I glimpsed Elaine laughing while talking with one of the participants—and my sobbing stopped. North Carolina's Casting for Recovery program is a superlative event in so many ways—well worth being a part of as a participant or volunteer, and certainly extremely worthy of our financial support. ◆

Bruce Ingram is the author of several outdoor books, including The New River Guide *($18.25) and* Fly and Spin Fishing for River Smallmouths *($19.25). To purchase one, send him a check at 1009 Brunswick Forge Road, Troutville, VA 24175.*

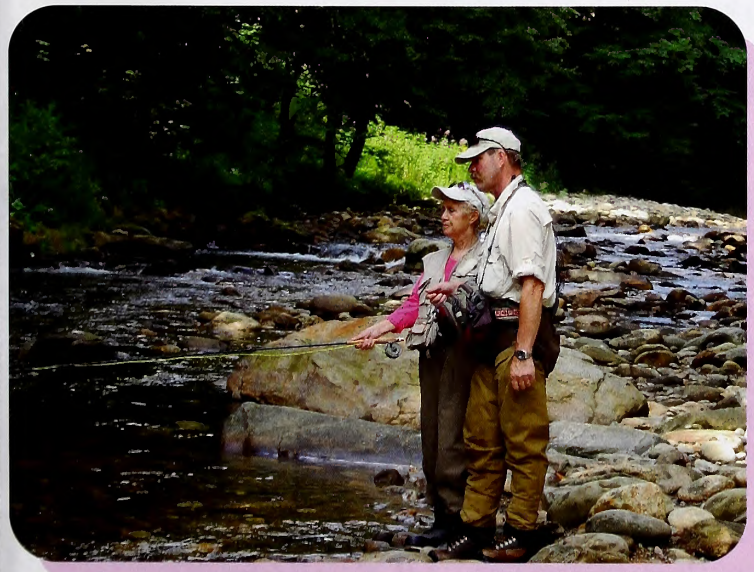
Opposite page: Shepherd and Baker. This page, top left: CFR organizer Starr Nolan, with fish, and participant Trudy Johnson show that even test casts in Lake Logan can bring in fish. Top right: Shepherd and Baker work on the retrieve. Bottom left: Kellner and Klug talk about casting techniques. Bottom right: Salter educates Coggins about fly selection.

COURTESY OF STARR NOLAN



COURTESY OF STARR NOLAN

I am so grateful for being chosen to be a part of this program. Going into it I was a little scared, not knowing what to really expect. But this has been a wonderful experience, and it has taught me that it is OK to step outside of my comfort zone.



Bright as parrots, aggressive as jays, they're

Beautiful Buntings

written by Susan Carl / illustrations and nature activity by Anne M. Runyon

Indigo and painted buntings make a vivid impression with their brilliant color and cheerful song. Few other North Carolina songbirds can rival the buntings' showy plumage. As colorful as any parrot, male painted buntings have blue heads, yellow-green backs and red underparts. Females of the species, and second-year males, are a bright greenish-yellow. The more common indigo bunting males are a vivid blue shade from head to tail. Only female indigo buntings and immature birds of both species lack brightly colored feathers.

Indigo buntings do not learn to sing while in the nest. Instead, young birds learn their particular song by imitating an older male with an established territory when they return to their breeding grounds in the spring. Since buntings usually return to the same area each year, this leads to neighboring birds having a similar local "dialect."

WHEN IS A BLUE BIRD BROWN?

On a cloudy day, even male indigo buntings may be surprisingly hard to recognize. That's because there is actually no blue pigment in the birds' feathers. Their bright blue appearance in the sun is due to the refraction of light off their brown feathers, much like the colors seen in a puddle of oil outside. Also, in late summer, males begin to molt and exchange their iridescent feathers for a nonrefractive brown.

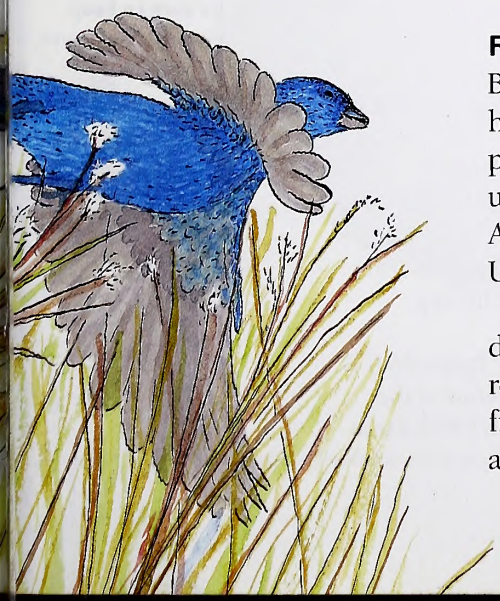
Captive indigo buntings were used in a pioneering study in the 1960s on bird migration. Exposing the birds to different star patterns in a planetarium, researchers found that the buntings gauged direction based on the constellations. Further experiments have revealed that birds also use the setting sun, the earth's magnetic field, odors, wind and topographic features for orientation while migrating.

SUMMERTIME SONGSTERS

Both indigo and painted buntings are summertime residents in North Carolina, where they are busy establishing territories, building nests and raising young. Male birds arrive in April before the females, and claim a territory they defend with vocalizations and by chasing off intruders. What we think of as bird song is often a "keep away" message from one male to another. Painted buntings are particularly pugnacious, and these small birds may fatally fight one another in defense of their territory. Their songs also serve to attract female birds. The females choose the best territory for nesting sites, and those are held by dominant males.

After a site is chosen, the female bunting builds a cup-shaped nest, usually low in the branches of a tree or bush. She lays three to four eggs in the nest, which is constructed of leaves, grasses, and bark strips, often woven together with spider webs. The female does most of the nest building, egg incubation and feeding of the nestlings. The male bunting's primary role is to stay near the nest, singing and defending the area from intruders. Once the young birds leave the nest, the male helps provide for them while the female may renest and raise another brood.

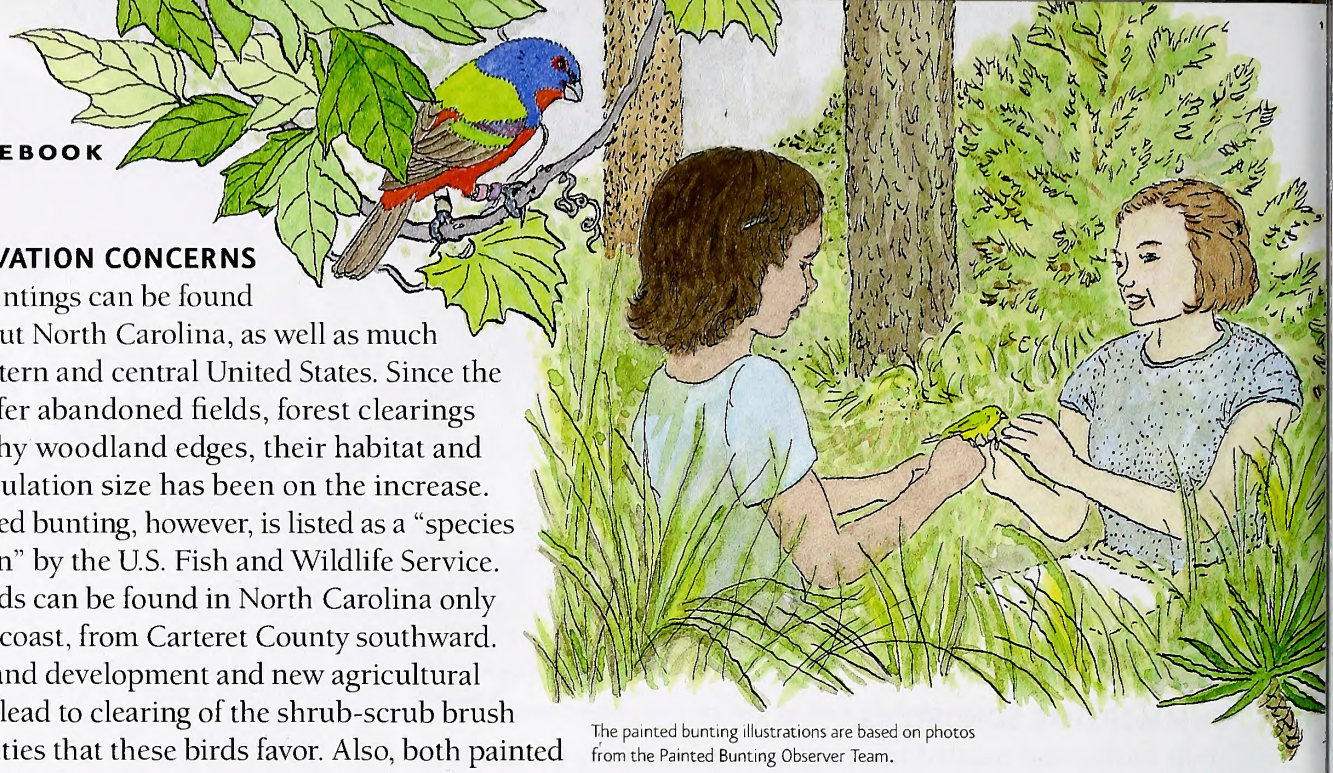
In addition to habitat loss and foreign caged bird trade, painted buntings are vulnerable to cowbird parasitism of their nests. Cowbirds lay their eggs in other birds' nests, and the young are raised by the host parent. Cowbirds have only recently reached the southeastern range of the painted bunting, so the buntings have no adaptations to recognize or respond to the cowbirds. Up to 80 percent of their nests may be parasitized by these larger birds.



FLY BY NIGHT BIRDS

By the end of October, buntings have raised their young and are ready to head south toward a warmer climate. During migration, indigo and painted buntings will fly together in large flocks at night for distances of up to 2,000 miles. Indigo buntings winter in Mexico, Central and South America and the Caribbean, while painted buntings from the southeastern United States fly to south Florida, Cuba and the Bahamas.

The birds' social life changes remarkably in the tropics. Rather than defending territories from one another, buntings form loose flocks that roost together at night and forage together by day. Even their diet changes, from the preferred insects and spiders during breeding season to seeds and buds in the winter.



The painted bunting illustrations are based on photos from the Painted Bunting Observer Team.

CONSERVATION CONCERNS

Indigo buntings can be found throughout North Carolina, as well as much of the eastern and central United States. Since the birds prefer abandoned fields, forest clearings and brushy woodland edges, their habitat and their population size has been on the increase. The painted bunting, however, is listed as a "species of concern" by the U.S. Fish and Wildlife Service. These birds can be found in North Carolina only along the coast, from Carteret County southward. Coastal land development and new agricultural practices lead to clearing of the shrub-scrub brush communities that these birds favor. Also, both painted and indigo buntings males are caught and sold as caged birds in some countries where they winter.

To better understand changes in the painted bunting population, wildlife researchers formed the Painted Bunting Observer Team in 2005. Volunteers living in the bird's breeding areas record sightings of buntings at their bird feeders and enter the information into a multi-state database. Some backyard feeder locations are also randomly chosen by project scientists as bird banding sites. Researchers carefully fit four colored bands on the buntings' legs that allow observers to distinguish one bird from another. The field data collected by citizen scientists is used to determine the birds' life characteristics and backyard feeder use. Team members hope this information will help them develop strategies for sustaining the painted bunting population in the southeastern United States.

Get Outside

This is a great time of year to watch buntings in North Carolina. Females are nesting, and the stunning male birds can be seen belting out songs from exposed perches. Look for typical bunting behavior such as a sideways tail twitch, and observe them foraging for insects on or near the ground. Do you see juvenile or female buntings nearby? Listen closely to hear any neighboring males that may be singing, and note differences in the bird songs. Later in the summer, watch for molting male indigo buntings that will be a mix of brown and bright feathers.

To attract buntings and other birds to your yard, provide a bird feeder with a white millet seed mix. Planting native trees and bushes like yaupon holly and wax myrtle helps provide habitat, and flowers such as zinnias, asters, cosmos and sunflowers produce seeds for the birds. Buntings have strong site fidelity, and the same individuals may return to your yard for several summers.

If you live in coastal North Carolina within the painted bunting's breeding range, you have the opportunity to be part of the Painted Bunting Observer Team. Over 500 active citizen scientists from North Carolina south to Florida are recording sightings of the birds in their own yards. For further information see the team's Web site listed under Read and Find Out.

Read and Find Out

- "Birds of the Carolinas" by Eloise F. Potter, James F. Parnell, Robert P. Teulings and Ricky Davis, University of North Carolina Press, 2006.
- "The Birder's Handbook: A Field Guide to the Natural History of North American Birds" by Paul R. Ehrlich, David S. Dobkin and Darryl Wheye, Fireside, 1998.
- "The Sibley Guide to Bird Life & Behavior" by David Sibley, Knopf, 2001.

In *Wildlife in North Carolina:*

- "Bird Without Equal" by Ida Phillips Lynch, April 2004.

On the World Wide Web:

- Cornell Lab of Ornithology: www.allaboutbirds.org
- Painted Bunting Observer Team www.paintedbuntings.org

Find out more about Project WILD Workshops and literature at the Wildlife Commission's Web site at www.ncwildlife.org.

Be sure to keep kitty in the house.

Make a Painted Bunting Paper Sculpture

A traditional name in the South for painted buntings was "nonpareil," which in French means "without equal," due to their great beauty. In North Carolina this rare migratory songbird breeds in the shrub-scrub communities found in Carteret County and south along the coast. Visit www.paintedbuntings.org for more information.

1) Cut out body and wing shapes.
2) Match and glue upper and lower wing shapes together.
3) Lightly fold wings up along ---- line.
4) Fold body in half along ···· line, and cut wing slot on back.
5) Glue forehead together.
6) Insert wings (with upper side on top) into slot on back.
7) Curl and glue the abdomen together, matching the curve.
8) Hang your painted bunting on a thread.

This activity may be downloaded at www.ncwildlife.org, the magazine page, and copied for educational purposes.

Money Available from Wildlife Commission for Inland Pumpout Stations

Marina owners: If you want to improve your facilities and help keep North Carolina's water clean, the N.C. Wildlife Resources Commission has an offer you can't refuse. The agency would like to give you money to install, renovate or maintain a boating pumpout station and waste reception facility.

The commission's Division of Engineering Services administers federal funds made available by the Clean Vessel Act for the purpose of installing pumpouts. The goal of the funding is to make the service widely available to recreational boaters. Federal funds can cover up to 75 percent of an approved project, while the grant recipient must provide at least 25 percent of total costs.

Raw or poorly treated boat sewage contains hazardous bacteria that can spread disease through direct contact or contaminated fish. This bacteria depletes underwater oxygen, robbing fish and other aquatic life of ample air to survive. Sewage also acts as a fertilizer for algae growth, blocking sunlight from aquatic vegetation. In addition to the harmful effects of sewage dumped into the water, the chemicals used in boat holding tanks—deodorizers, formaldehyde, chlorine and ammonium compounds—can be toxic.

EDSON INTERNATIONAL

Boating facilities such as private, commercial or municipal marinas and gas docks located on inland waters qualify for the funding. To request complete grant program guidelines and an application, contact Cindy Edwards at 919-707-0156.

CHARLIE MARTIN/DES MOINES MARINA

The Clean Vessel Act Grant Program began in 1993 and has been reauthorized a number of times. Its funding has resulted in construction of almost 5,000 waste reception facilities in 45 states. In North Carolina, General Statute 75A 10 (c) prohibits overboard dumping of boating waste, which can "render the waters unsightly, noxious or otherwise unwholesome as to be detrimental to the public health or welfare, or to the enjoyment and safety of the water for recreational purposes."

For a complete list of marinas with pumpout stations, visit www.ncwildlife.org and click on Boating and Waterways.

Look for the Pumpout Station logo at marinas for safe, environmentally responsible emptying of a boat sewage system.

IN SEASON

This month, these seasons are open in North Carolina:

Roanoke River Striped Bass Management Area: Continues through April 30 unless closed by proclamation.

Wild Turkey (Male or Bearded Only): April 10–May 8.

Youth Wild Turkey Day (Male or Bearded Only): April 3.

There is no closed season or bag limit for groundhog, coyote, striped skunk and nutria. There is an open season for taking beaver with firearms during any other open season for the taking of wild animals.

Check the *2009–2010 North Carolina Inland Fishing, Hunting and Trapping Regulations Digest* for bag limits and applicable maps or visit www.ncwildlife.org.

Commission Moves Public Hearings to September

The N.C. Wildlife Resources Commission has voted to move its annual public hearings from January to September as a part of overall adjustments to its rulemaking cycle.

"Adoption of rules on an annual basis is critical to meeting our conservation objectives," said Gordon Myers, executive director of the Wildlife Resources Commission. "Prior to making these changes, the commission's rulemaking cycle was severely impacted by delayed implementation of rules. These impacts were felt by our sportsmen and created a great deal of confusion. By adjusting our annual rulemaking cycle, we are able to better ensure timely adoption of rules while providing better service to North Carolina's sportsmen."

Each year, the commission adjusts hunting, fishing and trapping seasons in response to wildlife population changes, wildlife conservation objectives or public needs and desires. Public comment on proposed rule changes is a critical component in the decision-making process. The commission will continue to provide a variety of public input options, including online, written and face-to-face opportunities. The commission will notify constituents of these opportunities months before the public hearings begin.

This is not the first time the Wildlife Commission has adjusted its rulemaking cycle. Prior to the 1980s, inland fishing and hunting regulation proposals were developed on separate schedules: Public hearings were conducted in September for inland fishing regulation proposals and April for hunting regulation proposals. In 1983, the commission integrated the cycles and began conducting a single set of public hearings in the month of March. Several years later, as a result of changes in the Administrative Procedure Act, the commission moved the hearings to January. The supporting purpose of the change was to ensure that regulations could be implemented prior to hunting and trapping seasons.

For more information on the rulemaking process, visit www.ncwildlife.org/Regs/documents/PubHearBrochure.pdf.

MELISSA MCGAW / NCWRC

Wildlife Officers Honored by Mothers Against Drunk Driving

"What are game wardens doing here?" The question was discreet but honest. Troopers, deputies, policemen and prosecutors from throughout North Carolina crowded the hallway, awaiting a biennium banquet by the state chapter of Mothers Against Drunk Driving. Wildlife officers—colloquially known as "game wardens"—were newcomers here.

In an audience dedicated to prevention of drunken driving, this was a first-time recognition of wildlife officers for efforts and achievements to prevent drunken boating.

NCWRC

From left: Carlisle, Barker, Radabaugh, Stoop, Taylor and Capt. Chris Huebner, state boating safety coordinator.

Consumption of alcohol, even at levels below legal intoxication, can affect skills necessary to operate a boat, such as peripheral vision, balance and equilibrium, as well as coordination and reaction time. Alcohol is a factor in more than 20 percent of boating fatalities nationally. In North Carolina, operating a recreational vessel while under the influence of an impairing substance or with a blood alcohol concentration of .08 or higher is illegal. Penalties include fines up to $1,000 and possible jail time.

The MADD Law Enforcement and Criminal Justice Awards of Excellence banquet was held Jan. 22 in Raleigh, with the N.C. Wildlife Resources Commission receiving the Agency of the Year Award for 2008 achievements. The award goes to a law enforcement agency that has demonstrated excellence in implementing innovative and creative techniques in the detection and deterrence of impaired driving.

"In this case, that driving was on the water," said Lori Brown, development officer with the North Carolina office of MADD. "Law enforcement is the first line of defense, and the role of Wildlife Resources Commission officers in both enforcement and instruction is exemplary."

Sgt. Reggie Barker of Chatham County, Master Officer Allen Carlisle of Catawba County, Lt. Todd Radabaugh of Pender County, Sgt. Brad Stoop of Bertie County and Master Officer Ryan Taylor of Carteret County accepted the award. These wildlife officers make up the state's Boating Under the Influence Instructor Team, which conducts instruction in detecting and apprehending intoxicated boaters.

These officers also are leaders in the statewide "Boat Safe, Boat Sober" campaign, which combines public awareness with stepped-up enforcement and training efforts to reduce the number of alcohol-related accidents and fatalities on the water, as well as on the road after drinking while boating.

CALENDAR OF EVENTS

Friday–Sunday, April 9–11

Take part in the Beyond BOW Fly-Fishing Experience at the Pisgah Center for Wildlife Education near Brevard. Limited to 20 participants. Contact BB Gillen at (919)-218-3638 or bb.gillen@ncwildlife.org.

Tuesday–Sunday, April 13–18

Join the festivities and celebrate the shad run on Contentnea Creek at the 39th Annual Grifton Shad Festival. Most activities take place on April 17–18. Contact (252) 524-5168. Visit www.grifton.com.

Friday–Sunday, April 16–18

Learn the outdoors in the Becoming an Outdoors-Woman session at the Eastern 4H Center in Columbia. Fee is $200. Contact BB Gillen at (919)-218-3638 or bb.gillen@ncwildlife.org.

Friday–Sunday, April 23–25

Check out the 11th annual Southern Side-by-Side Spring Classic at Deep River Sporting Clays near Sanford. Competitions will be held for side-by-side shotguns of various gauges. Contact (919) 774-7080. Visit www.deepriver.net.

Learn about wild edible foods and herbs at the 35th annual N.C. Wild Foods Weekend at Betsy Jeff Penn 4-H Camp near Reidsville. Contact Debbie Midkiff at (919) 489-2221 or e-mail debbiemidkiff@hotmail.com.

Saturday, April 24

Enjoy a "Songbird Celebration" with bird-related classes, hikes and activities for all ages at Blue Jay Point County Park near Raleigh. Hours are 9 a.m. to 3 p.m. Contact (919) 870-4440.Visit www.WakeGov.com/parks/bluejay.

Readers should check with the contact listed before traveling to an event. Items for listing should be conservation-oriented and should be submitted at least four months in advance to jim.wilson@ncwildlife.org, or call (919) 707-0177.

Commission Restricts Import of Deer Heads from Virginia

The N.C. Wildlife Resources Commission is warning citizens that a white-tailed deer in Virginia has tested positive for chronic wasting disease (CWD). As a result, North Carolina taxidermists can no longer accept full heads for mounts from Virginia and must inform wildlife officers if they receive one.

In addition, anyone bringing a deer from Virginia, or the 15 other states or two Canadian provinces where CWD has been detected, must follow North Carolina processing and packaging regulations (www.ncwildlife.org/Hunting/documents/15ANCAC10B_0124.pdf).

States where CWD has been detected are Colorado, Wyoming, South Dakota, Nebraska, Montana, Wisconsin, New Mexico, Minnesota, Oklahoma, Illinois, Utah, West Virginia, New York, Kansas, Michigan and, now, Virginia. It has also been detected in Canada's Alberta and Saskatchewan provinces. Five of the states are east of the Mississippi River.

TODD PUSSER

The Wildlife Commission tested about 1,400 free-ranging white-tailed deer for CWD in 2009, and no CWD was found.

Taxidermists may call 1-800-662-7137 to report receipt of a full head from Virginia.

The Virginia deer, a 2-year-old doe, was killed by a hunter in Frederick County less than 1 mile from the West Virginia line. This was the first positive test sample out of nearly 5,000 deer tested in Virginia since 2001. The Virginia Department of Game and Inland Fisheries (VDGIF) has been sampling hunter-killed and road-killed deer from the Active Surveillance Area in western Frederick and Shenandoah counties since 2005, when CWD was first detected near Slanesville, W.Va., within 10 miles of the state line. Between 2005 and 2009, CWD has been detected in 62 deer in Hampshire County, W.Va., out of nearly 10,000 total deer sampled during that time. Several have been found within 5 miles of the Virginia line.

CWD is a disease of deer and has not been found to be transmitted to humans or other animals. CWD is a slow, progressive neurological (brain and nervous system) disease found in deer, elk and moose in North America. The disease ultimately results in death. Species known to be susceptible include elk, red deer, moose, mule deer, white-tailed deer and black-tailed deer. CWD belongs to a family of diseases known as transmissible spongiform encephalopathies. There is no evidence that CWD can be naturally transmitted to livestock or other (nondeer) animals.

There is no current scientific evidence that CWD has ever infected humans. However, it is recommended that human exposure to the CWD agent be avoided, and hunters should take simple precautions such as not consuming any deer that appear abnormal or sick, and wearing gloves when field dressing and boning out the meat. In addition, it is recommended that hunters avoid consuming meat and tissues from known CWD-infected animals.

For more information on chronic wasting disease, including safety tips, visit www.ncwildlife.org or www.cwd-info.org.

e NEWSLETTER

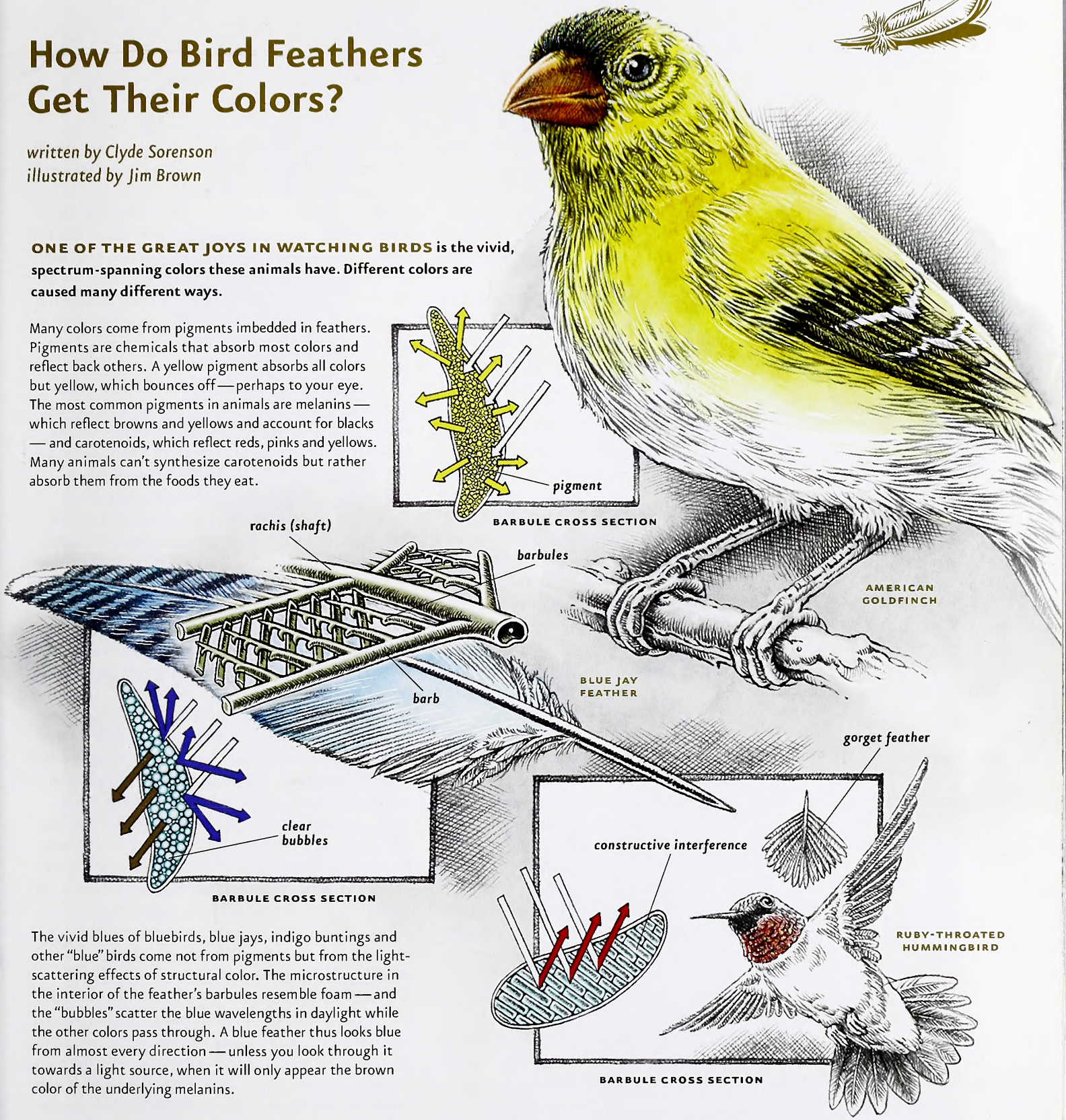
Get N.C. Wildlife Update—news including season dates, bag limits, legislative updates and more—delivered to your Inbox from the N.C. Wildlife Resources Commission. Sign up at www.ncwildlife.org/enews.

How Do Bird Feathers Get Their Colors?

written by Clyde Sorenson
illustrated by Jim Brown

ONE OF THE GREAT JOYS IN WATCHING BIRDS is the vivid, spectrum-spanning colors these animals have. Different colors are caused many different ways.

Many colors come from pigments imbedded in feathers. Pigments are chemicals that absorb most colors and reflect back others. A yellow pigment absorbs all colors but yellow, which bounces off — perhaps to your eye. The most common pigments in animals are melanins — which reflect browns and yellows and account for blacks — and carotenoids, which reflect reds, pinks and yellows. Many animals can't synthesize carotenoids but rather absorb them from the foods they eat.



The vivid blues of bluebirds, blue jays, indigo buntings and other "blue" birds come not from pigments but from the light-scattering effects of structural color. The microstructure in the interior of the feather's barbules resemble foam — and the "bubbles" scatter the blue wavelengths in daylight while the other colors pass through. A blue feather thus looks blue from almost every direction — unless you look through it towards a light source, when it will only appear the brown color of the underlying melanins.

The brilliant, glistening red of a ruby-throated hummingbird is a different type of structural color — constructive interference and refraction. The surface of the feather has microscopically thin layers that act as prisms. The thickness of these layers dictate the colors that reflect back. Often, these colors can only be viewed from a relatively narrow angle — the color patch goes black if you are viewing from outside this range.

The 50-Gallon Drum List

written by Jim Dean

It seems that lots of people these days are compiling "bucket lists" of things they'd like to do before they kick their personal buckets. You know, of course, that kicking the bucket is slang for croaking, buying the farm or "winning a one-way ticket to fish the River Styx." But let's not carry our euphemisms beyond the pail here.

ILLUSTRATION BY JACKIE PITTMAN

Most of us like to think we're too youthful and healthy to compile such lists, but it occurs to me that it makes sense to get started early in life when some of those dreams might have a realistic chance of fulfillment. After all, waiting until you're on the cusp of geezerhood will physically rule out a lot of goals. You can't have realistic hopes of taking first place in "Dancing with the Stars" if your cane is a necessity rather than a prop, and nobody wants to see you boogying out there anyway if you're old and gray, and incontinent.

"Having the snot scared out of you seems to run counter to the pursuit of pleasure."

Like you, I've always had lots of things I hoped to do one day, and because a sizeable percentage of these things have not yet come to pass, I recently started an informal list just for the fun of it. Right away, I could see a logistical problem. No mere bucket would be big enough—a 50-gallon drum is more like it.

I doubt, however, that many people would find my list very exciting. I have, for example, no desire whatsoever to jump out of a perfectly good airplane, yet that seems to be a top-five pick for some folks. Nor do I have any interest in bungee jumping, peering into a volcano from the sulphurous rim, scuba diving at night in the Mariana Trench or becoming a famous lion tamer. One thing these adventure-heavy choices have in common is extraordinary risk, and having the snot scared out of you seems to run counter to the pursuit of pleasure.

Another popular choice is to assemble a unique group to join you for a last supper. It's almost invariably an extremely diverse and eclectic guest list dominated by celebrities and other notables (some still alive). I saw one such list that included Abraham Lincoln, Eric Clapton, Marilyn Monroe, Leo Tolstoy, Taylor Swift, Junior Samples, Thelonius Monk, Leonardo da Vinci, Beyonce, Elvis and the Pope. This would surely be one heck of a dinner party, and I'll have to admit it would be fascinating to meet any of them individually. But what could you possibly serve that everyone would eat or drink?

More seriously, I'm betting your choices are, like mine, much more mundane. You may recall that I have previously mentioned that I once hoped to sail around the world, possibly alone. This, however, is an example of a notion better left to imagination. It's one thing to romantically visualize running before a Roaring Forties gale under storm canvas, and quite another to have no other option.

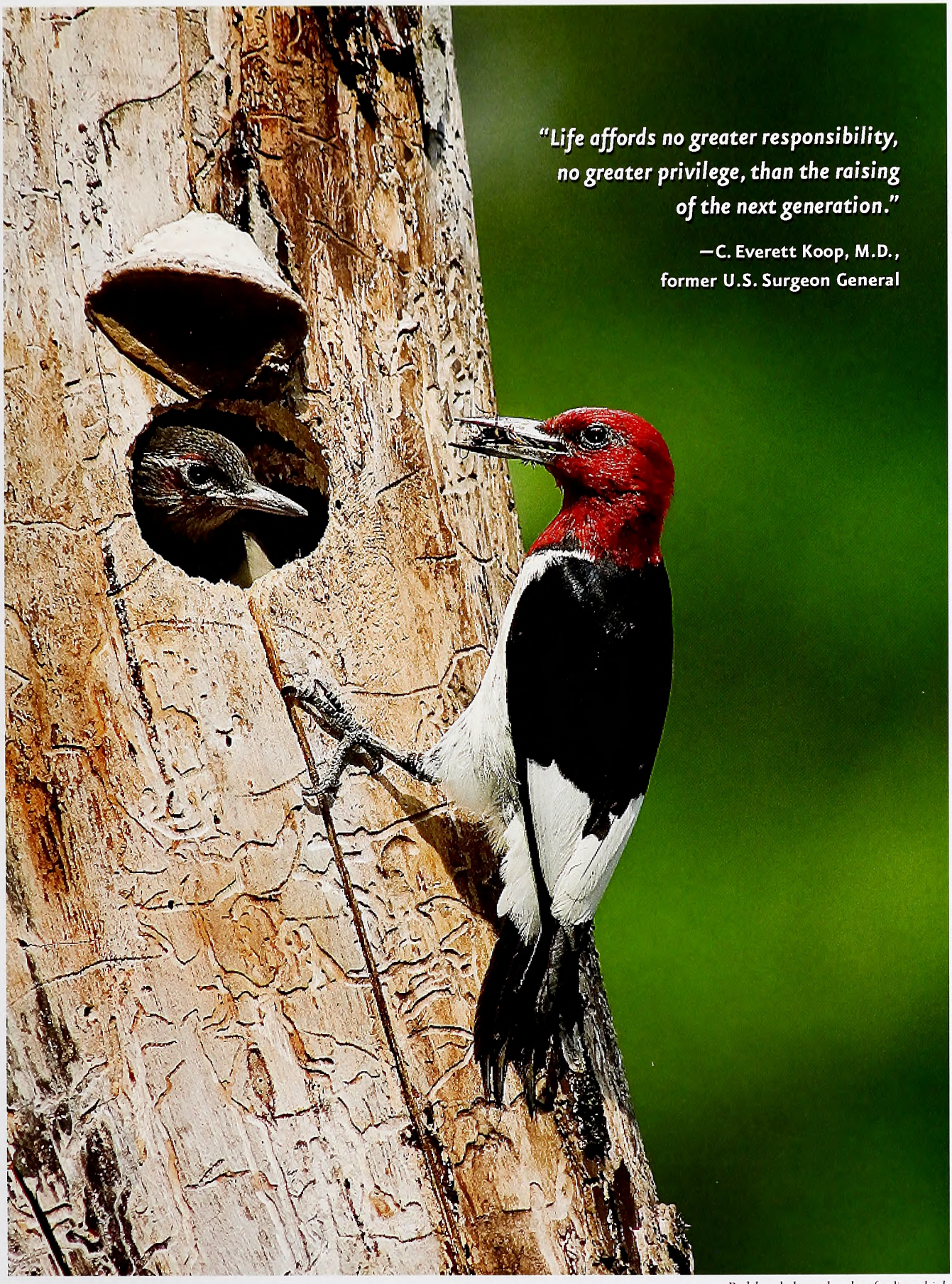
There are, however, other more realistic possibilities, and it shouldn't be surprising that many of mine involve fishing. I'd like to fish more of those superb trout rivers in the American West, and I'm also hoping to extend my limited experience fly-fishing for bonefish, permit and tarpon in the Caribbean. I would also love to catch a largemouth bass over 10 pounds. I have gotten close a few times, but I still haven't broken that barrier (I'll release the fish, honest).

I do still hope to sail my old boat alone or with a few good friends on some extended cruises, but a few weeks or a month or so would suffice, and I doubt I'd be out of sight of land for very long (we might run out of beer and wine).

It is also increasingly unlikely that I will see as much of the world as I once hoped. There are simply too many wonderful places to visit within our allotted time and resources. But perhaps I may still visit the ruins of Bronze Age Greece, Troy and Crete, eat exotic seafood in a sun-washed, seaside cafe on the Mediterranean, or perhaps even sip my way across France. It would be gravy if I could add side trips to Patagonia, New Zealand, Christmas Island and—oh, what the heck, the rest of Europe and Asia.

As for compiling an imaginary dinner list, that's easy. Forgive the sentimentality, but my guest list would include only my dearly beloved and long departed family members. We'd gather for one more big Thanksgiving at my grandparents' rural home in Northampton County where the table would be trembling under the weight of a 35-pound turkey, fresh ham, country ham and all the other favorite dishes that were always served. We'd finish it off with real mincemeat pie and homemade vanilla ice cream. Then, a month later at Christmas, we'd do it all again in the house my brothers and I grew up in with Mom and Dad.

And of course, Marilyn Monroe could join us if she really wanted to.



ANDY WALKER

Red-headed woodpecker feeding chick

OUTDOOR MOMENT

IN THE MAY ISSUE

TODD PUSSER

REPTILIAN EYE

See some of North Carolina's broad array of reptiles up close and personal in this unique photo feature.

BLISSFUL ISOLATION

The underutilized Uwharrie River boasts gorgeous views and a diverse fishery suitable for floating or wading.

LONG VIEW

An unlikely set of partners has collaborated on a plan to restore 8 million acres of longleaf pine habitat.

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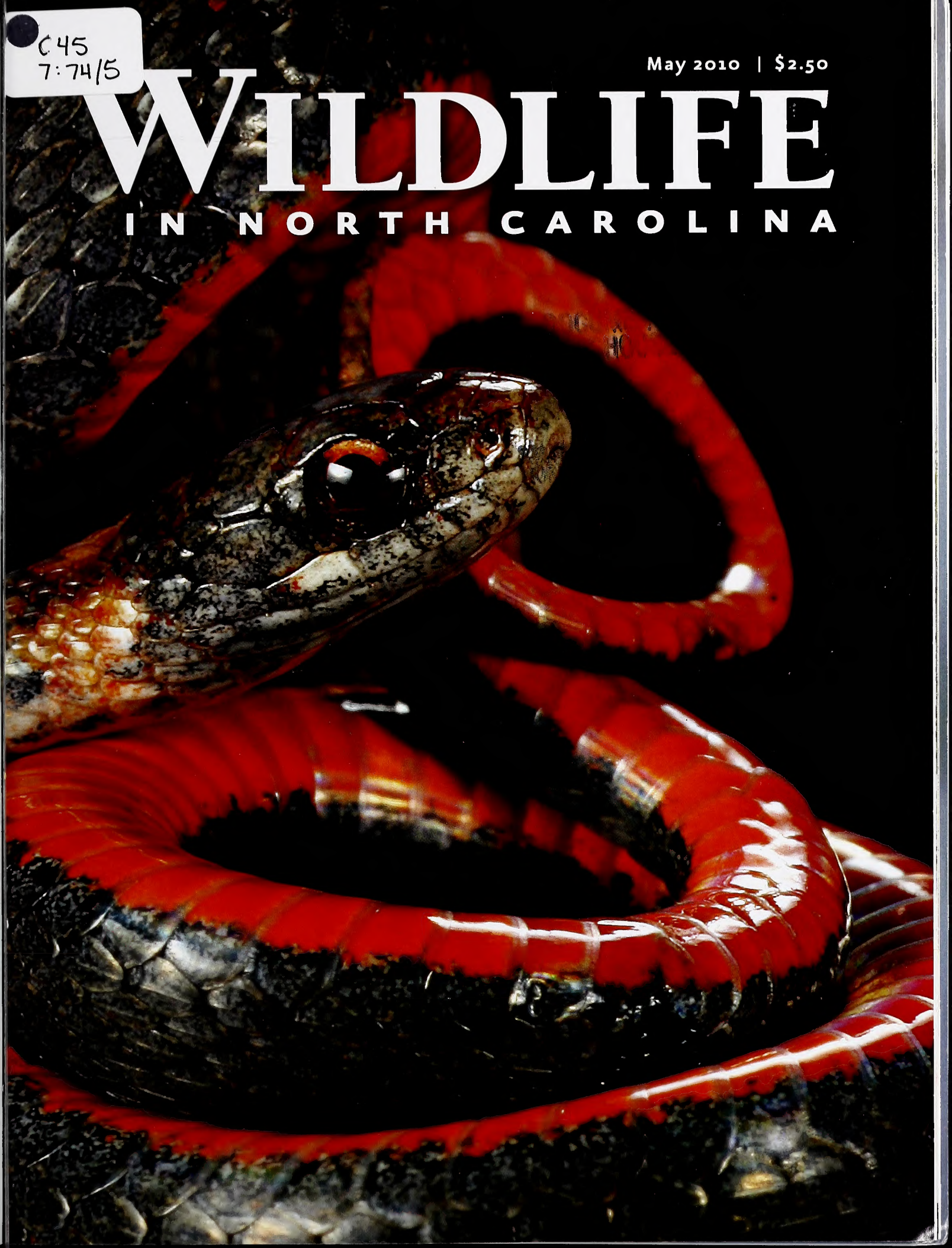

Fire is a friend to the longleaf pine. Its seeds sprout best after a ground fire reduces the amount of organic material on the forest floor. **PHOTOGRAPH BY TODD PUSSER.**

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Cover: The redbelly snake is a creature of moist woodlands, where it feasts on slugs. Adults rarely grow more than a foot long. PHOTOGRAPH BY TODD PUSSER.

Wildlife in North Carolina is the official educational publication of the North Carolina Wildlife Resources Commission. It is dedicated to the sound conservation of North Carolina's wildlife and other interrelated natural resources and also to the environment we share with them.

EDITOR'S NOTE

On the next page, we are publishing our second consecutive page of Letters from Readers about "Clear-Cut Benefits," a story by David Hart that ran in the February 2010 issue. It's difficult for me to count how many comments I have received about that story via e-mail and regular mail, and in person. No story in years has garnered more mail. People came, it seems, out of the woodwork to comment on this article.

BILL LEA

Opinion ranged from exceedingly complimentary—"right on target" said Mac McConnell—to downright damning—"smells like manure" began Mark Anderson's five-page letter. "*Wildlife in North Carolina* got played [by timber interests]" said a letter that was signed only with an "X." One writer was "distressed." Another said, "It's about time."

Gordon Warburton, the N.C. Wildlife Resources Commission's supervising wildlife biologist for the Mountain region, says that timber management on national forests is often an emotional issue, except to the people actually taking part in the management. He says that focusing entirely on clear-cutting is obfuscating the bigger picture.

"We need diversity in the ages of our forest," Warburton says. "A diversity of ages or habitats equals a diversity of wildlife species. Also, our oak forest is mature and is aging. We need to ensure our next generation of acorn-producing trees. These are widespread and urgent issues. Whatever techniques we employ, it is important that we carefully introduce disturbances into our forests for wildlife. We should protect old-growth areas and we should provide younger forests in order to maintain biodiversity."

Hart, a veteran outdoors writer and longtime contributor to *WINC*, has no ties to the timber industry. His interest in the issue stems from his experiences as a conservationist and hunter who has observed ruffed grouse populations and habitat declining.

"It's a trend that can be easily reversed through sound timber management," Hart says. "A growing number of conservationists are realizing the value of habitat diversity, especially on our national forests, which currently consist almost entirely of decades-old trees. I understand the need to preserve old-growth forests . . . but I also understand that in order to have species diversity, we need habitat diversity, not a monoculture of 100-year-old forests. Old forests and young forests can co-exist."

But can people with differing opinions about how to manage national forests co-exist?

Greg Jenkins

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Clear-Cut Views

It's distressing to see *Wildlife in North Carolina* print an apology for clear-cutting without going into the other side of the issue ("Clear-Cut Benefits," Feb. 2010). Yes, new clear-cuts will produce habitat for small game for a few years. But pine plantations, the eventual ecosystems on the land, do not. They are monocultures, just like corn crops, if you will. And the pine plantations last for many more years than the stuff that grows up just after the clear-cut.

North Carolina existed without clear-cutting for centuries before industrial forestry arrived on the scene, and wildlife survived quite well. There are other and better ways to harvest trees than to cut everything down and start over. This quote from a tree farmer friend gives us a little more balanced view of forest management. "Every time we thin it out," he said, "we take the worst and leave the best. What grows back gets better and better." Of course, there's no need to mention the erosion that can follow a clear-cut; that's what silted up our pond.

We can have small-game habitat without clear-cuts by leaving hedgerows and thickets and brush at the edges of fields. That's the kind of habitat that supported small game in the old days, and it is what we should be promoting today. There are points to what your lumberman is saying, but it is a lumberman's view.

Tom Dillon
Winston-Salem

I do appreciate David Hart's article on clear-cuts in the February issue. While I agree that early successional habitat provides numerous wildlife benefits, I am concerned that the article may have given the impression that clear-cuts are the only way to create such habitat. The silvicultural practices known as shelterwood cuts and group selection cuts can also play a role in creating early successional habitat. Even the practice of thinning trees will create such habitat for a limited time. Landowners should be apprised of all the options, so as to choose the right tool for the purpose at hand.

Lastly, there was a misstatement in the article which listed poplars as a shade-tolerant tree. If the poplars in reference are yellow poplar (a.k.a.: tulip poplar, *Liriodendron tulipifera*) then this reference could not have been further from the truth. In my experience yellow poplars are very shade-intolerant.

Monty Wooten, Registered Forester
Asheville

David Hart's article "Clear-Cut Benefits" in the Feb. 2010 issue brought back memories, not all of them pleasant. I was a participant in the clear-cutting pro and con discussions in western North Carolina in the 1980s and wound up making few friends on either side. My use of the word "side" paints part of the picture: Like too many issues discussions, this one became needlessly polarized.

The controversy began in reaction to certain excesses: Some advocates for the timber industry seemed bent on minimizing restriction and regulation of timber harvest, perhaps to the benefit of the industry, but in ways which seemed to many of us to make questionable use of Forest Service employees' offices and taxpayers' money. The reaction to this included some individuals who not only did not know, but resisted learning, that logging on National Forests is as old as the National Forests themselves, and who insisted on treating it as a brand-new environmental insult which simply had to be stopped.

Then as now, one of the pro-logging contingent's strong cards was early successional habitat. Anyone who has ever hunted grouse or deer knows this is a legitimate concern. Many of the anti-loggers share my personal desire to live in an environment which is as close to "natural" as possible — though in some cases that resolve wilts when they are told that their subdivision is as much a part of the problem as the worst logging operation. It seems difficult for multiple-use advocates and preservationists to see where early successional habitat fits in the natural scheme of things.

I am on the side of biodiversity conservation, which to me means that our scarce old-growth forests, especially, must be protected for the sake of the multiple species we are not going to protect anywhere else. From a biodiversity standpoint, in the mountains, we must protect what is left of bottomland forests, which are mostly on private land. Hunting, and management for that purpose, are legitimate activities. And, being aware that wood products have to come from somewhere, I would prefer that they come from managed natural forests than from monoculture tree plantations or land being cleared for subdivisions.

If your article signals the reopening of the old debate about the best use of our forest lands, I sincerely hope it can occur in a context where education prevails over polarization, and where land managers are allowed to work for the public good and make difficult choices.

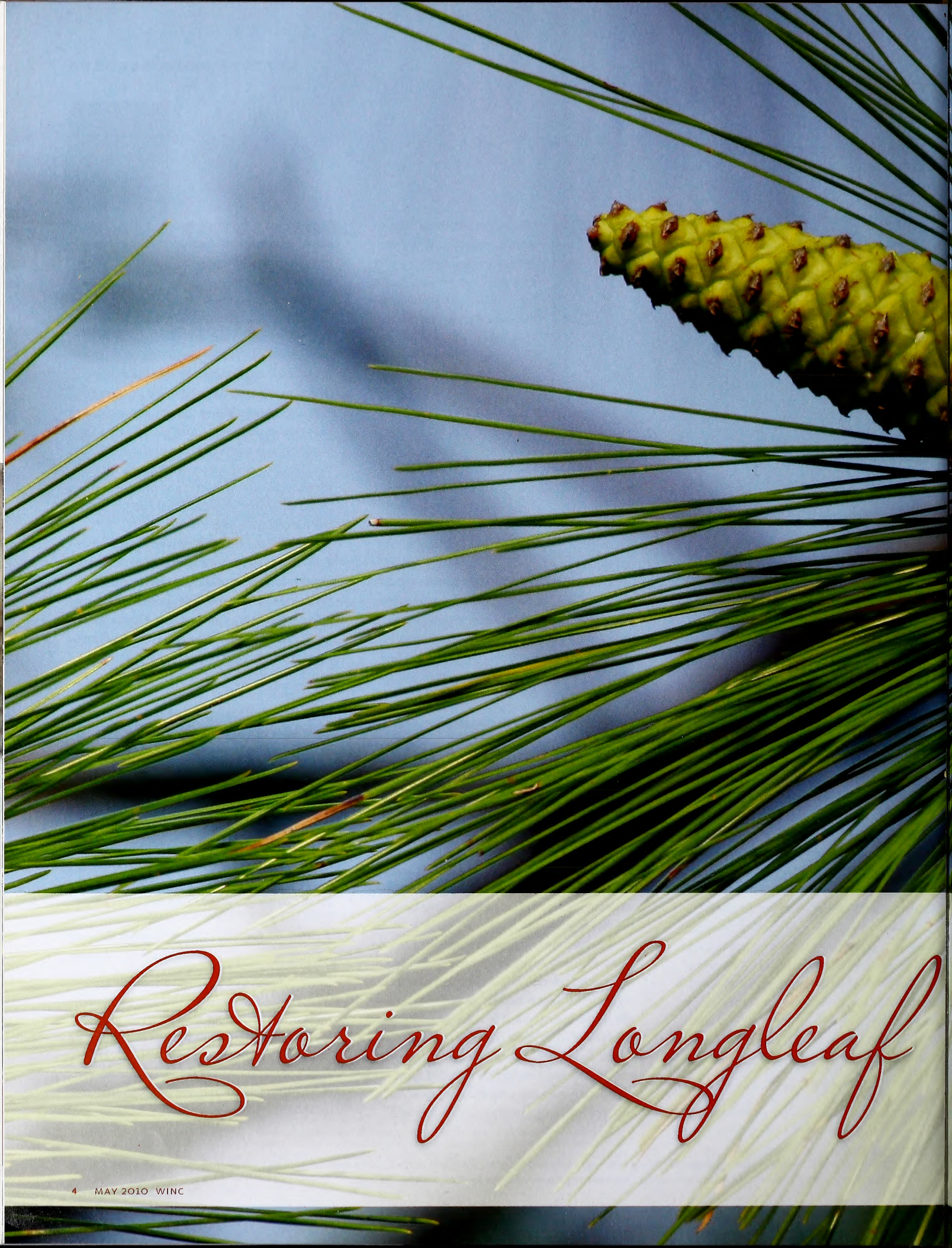
Bill McLarney
Franklin

The Wrong Redhead

The April 2010 Outdoor Moment photo of a red-headed woodpecker feeding its chick was incorrectly credited. It was taken by Ed Erkes, not Andy Walker. Erkes and Walker entered similar pictures in last year's photo competition, and we got them mixed up. WINC's staff regrets the error.

write us

Letters should be sent via e-mail to **letters@ncwildlife.org** *or through regular mail to Letters,* Wildlife in North Carolina *magazine, 1712 Mail Service Center, Raleigh, NC 27699-1712. Please include your name, address and daytime phone number. Letters chosen for publication may be edited for clarity and length.*



Restoring Longleaf

A diverse set of partners have developed a conservation plan to renew one of the South's most significant ecosystems

Written by Bill Ross
Photographed by Todd Pusser

In presettlement times, the wide expanse of North Carolina's Coastal Plain was comprised of longleaf pine forests, swamps and pocosins. Early travelers up the Cape Fear River described the landscape as an ocean of trees. The vastness of the longleaf pine ecosystem stretched from the lower part of Virginia to the eastern plains of Texas. Before Europeans settled in North America, the ecosystem totaled more than 90 million acres. Today, the longleaf pine covers only a fraction of that acreage. The U.S. Forest Service estimates that only 3.4 million acres of longleaf forests remain today.

Recognizing the devastating loss of much of the range of the longleaf pine forests, a group of unlikely partners developed a conservation plan aimed at restoring this ecosystem. The implementation of the Range-Wide Conservation Plan for Longleaf Pine already resulted in actions at the local, state and federal levels. Little by little, piece by piece, these actions are ensuring that this once-great forestland will rise again.

Readers of this magazine may recall previous stories detailing the ecological, cultural and economic importance of the longleaf pine ecosystem, which culminated in Larry Earley's captivating book "Looking for Longleaf: The Fall and Rise of an American Forest." Earley's writing captures the prominent historical importance the longleaf forest has in the economic and social fabric of eastern North Carolina.

Earley had originally intended to title the book with an emphasis on the fall of the forests. However, restoration efforts and the emergence of the plan encouraged him to acknowledge the very real possibility that this once-great ecosystem could be returned, at least in part, to its former glory.

The Power of a Plan

In much the same way the decline and devastation of the longleaf pine forests must be attributed to a number of sources, the renewal of this majestic ecosystem is dependent upon cooperation and coordination among an array of organizations, all with a strong interest in reviving and restoring longleaf pine to the landscape.

In 2005 a group of conservationists called for a focused effort for restoration of the longleaf ecosystem. As work was under way on this effort, a partnership of Southeastern states and military agencies known as the Southeast Regional Partnership for Planning and Sustainability was working on natural resource issues, one of which included restoration of longleaf pines. Seizing on the potential for collaboration, the conservationists, state leaders and armed services joined forces with the singular goal of working together to restore the longleaf pine ecosystem.

The outgrowth of this collaboration was a working group intent on developing a detailed conservation plan. A diverse set of partners joined together in 2007 to develop the America's Longleaf initiative, a working group comprised of more than 20 organizations. Participants included federal agencies such as the U.S. Forest Service and Department of Defense, forestry groups such as the American Forest Foundation, and nonprofit environmental organizations including the National Wildlife Federation and The Nature Conservancy. These organizations hoped to build on the momentum of the Longleaf Alliance, a nonprofit dedicated to restoring longleaf forests for their environmental and economic benefits.

Each of these groups stood to benefit and further its own interests from a successful restoration effort. The military service branches saw great potential to help prevent encroachment and protect critical training requirements, and other organizations viewed the work as having important wildlife and environmental benefits.

The potential wildlife benefits noted in the plan are numerous. The longleaf forest can sustain a variety of wildlife, including several species listed as endangered or threatened. A couple of these, the red-cockaded woodpecker and the gopher tortoise, are closely linked in the public's mind to the unique habitat of the longleaf. Though the plight of the red-cockaded woodpecker has been much publicized in recent years, the gopher tortoise found throughout Florida provides evidence that the significance of longleaf extends beyond ecology to history and culture. Gopher tortoise meat was a staple in the diet of many families during the Depression era of the 1920s and '30s and was often referred to as "Hoover chicken."

According to the N.C. Wildlife Resources Commission, actions to maintain longleaf pine forests through management practices such as thinning and burning can also benefit wildlife not directly dependent on longleaf pine habitat, such as turkeys, white-tailed deer and mourning doves. Mallory Martin, chief deputy director of the Wildlife Commission, cites the importance of the longleaf habitat and the unique assemblages of plant and animal species found in this ecosystem as the reason the agency has begun the process of restoring much of the considerable amount of land in its ownership in eastern North Carolina to longleaf pine.

Wildlife interests, climate change issues and many other topical areas were woven into the plan

as editors labored to shape the draft for a formal review. In early summer 2008 an initial draft of the plan was completed and circulated among the partnership organizations. Reviewers submitted dozens of detailed comments, which resulted in significant changes to the early version of the draft. All of the work and revisions to the original draft culminated in the release of the Range-Wide Conservation Plan for Longleaf Pine in March 2009.

MELISSA McGAW/NCWRC

The Plan in Focus

Right up front, the number jumps out: 8 million acres. The plan sets this ambitious goal of increasing the acreage of longleaf from 3.4 to 8 million acres in 15 years. Lark Hayes, coordinator of America's Longleaf and one of the primary drafters of the plan, states with no reservations that the effort to restore 8 million acres "is admittedly a bold and ambitious goal."

The coalition of partners behind the plan are acutely aware of the potential pitfalls of setting a goal so lofty, because falling short can be equated with failure. While the partners work toward the goal, they are also counting the successes along the way, such as increased collaboration among agencies and the growing public awareness of the longleaf restoration efforts. The goal of restoring 8 million acres, while a significant achievement, would still be less than 1/10 of the longleaf acreage at its pinnacle of coverage. Hayes, for her part, chooses to stay focused on the restoration efforts one step at a time and believes the long-term goal will take care of itself because the "enthusiasm is there to support the plan."

The core of the plan relies on strategies that will be carried out by maintaining existing longleaf ecosystems in good condition, improving acreage with longleaf already present in some form and restoring longleaf pines to suitable sites.

The plan identifies 16 "significant geographic areas" where existing resources and partners can maximize restoration efforts. The factors used to identify these significant landscapes included an area greater than 100,000 acres and management of a core of the acreage by a landowner with a long-term commitment to conservation. All 16 areas targeted for special attention have federal land that is being managed for longleaf pine. The areas identified as significant in North Carolina include the Onslow Bight area, the Sandhills and the Bladen Lakes region in the Cape Fear River basin.

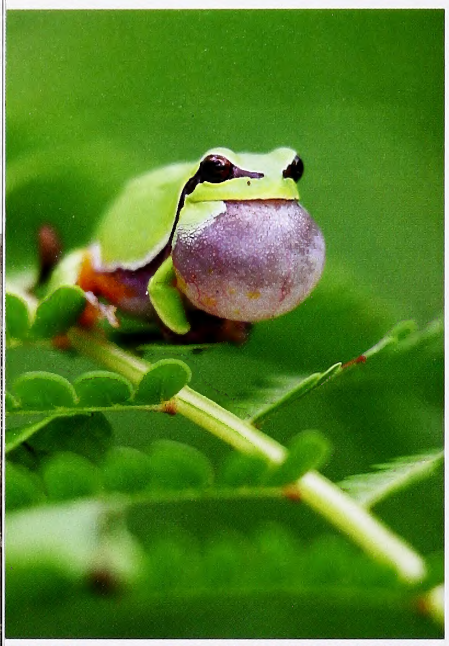
Despite the focus on federally managed lands, supporters of the plan are quick to acknowledge that the effort must include substantial involvement from private landowners. Finding the right mix of incentive programs and landowner assistance programs to attract private landowners to support the restoration work is paramount. One such program is already being implemented by the Wildlife Commission through the Landowner Incentive Program, with the goal being to work with landowners to implement management plans to restore wildlife habitat for at-risk species.

Public land such as Croatan National Forest (above) and Holly Shelter Game Land is the focus of the Longleaf Alliance's efforts to restore habitat for animals such as the little grass frog.

MELISSA McGAW/NCWRC

From public to private lands, the plan calls for actions with a particular emphasis on new opportunities that might arise from the development of carbon markets and other economic opportunities that would benefit private landowners. For example, the plan recognizes the intersection between mitigation efforts to address climate change and longleaf restoration.

Longleaf planners hope to duplicate similar efforts in the Southeast, such as the recent announcement by Duke Energy that it plans to reforest up to 1 million acres in the Mississippi Alluvial Valley in hardwoods to capture large quantities of carbon dioxide, create wildlife habitat and maximize benefits for landowners.



The return of vast expanses of classic longleaf pine savanna could increase populations of creatures such as the Pine Barrens tree frog and the American kestrel, and plants such as lupine.

The Plan in Action

In "Looking for Longleaf," Earley writes that "one decision at a time, it is surely the only way that longleaf will ever become a significant presence on the land once again." One of these decisions and an example of the plan being implemented on the ground can be found in the Sandhills of North Carolina in one of the state's fastest-growing counties. Hoke County, in partnership with The Conservation Fund, is working to establish the state's first community forest, which will protect wildlife habitat and riparian buffers and restore the longleaf pine ecosystem. The community forest, located on a 532-acre tract, will also have the potential to generate economic activity for the county through pine straw raking and timber harvesting. Hoke County commissioner Bobby Wright, a supporter of the project, believes that all parties involved benefit. In particular, he notes the lack of parks in Hoke County and cites the trails in the community forest as a place for the county's citizens to hike and recreate.

The recreation and wildlife benefits are complemented by the potential economic prospects. Despite rapid population growth —40,000 new residents are expected over the next four years—the county is still dealing with economic struggles from the loss of jobs in the agricultural and manufacturing sectors. The community forestry concept is based on the premise of generating income while at the same time meeting conservation goals. Hoke County retains control of the property and benefits from recreational activities, water quality protection and income generation.

The project in Hoke County has the added benefit of providing a buffer around Fort Bragg. As a result the land will remain undeveloped, thereby ensuring that the army's training requirements can proceed without the potential problems presented by encroachment.

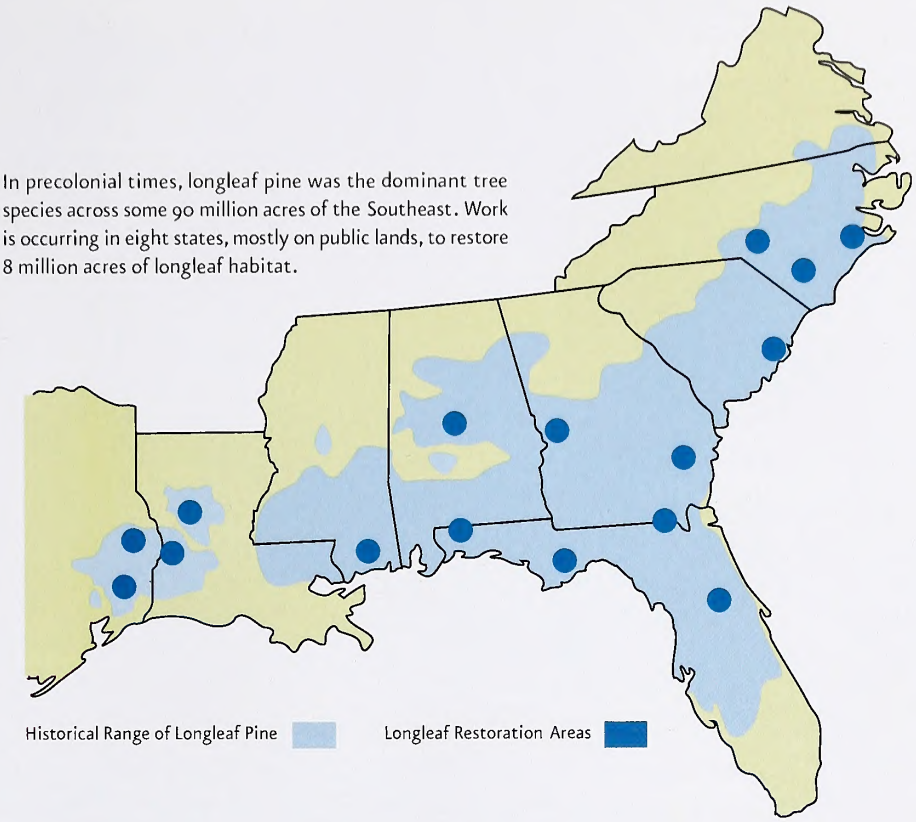
The ability to duplicate projects like the Hoke County Community Forest is increasingly likely as funding is targeted for longleaf pine restoration efforts. Five states in the Southeast received a $9 million award from the American Recovery and Reinvestment Act for the purposes of a longleaf

Longleaf Rising

Estimates of Existing Acres of Longleaf Forest

Alabama	716,824
Florida	927,413
Georgia	460,109
Louisiana	240,845
Mississippi	383,784
North Carolina	220,338
South Carolina	401,980
Texas	52,800
Total	3,404,143

The full Range-Wide Conservation Plan for Longleaf Pine can be found at www.americaslongleaf.org.



In precolonial times, longleaf pine was the dominant tree species across some 90 million acres of the Southeast. Work is occurring in eight states, mostly on public lands, to restore 8 million acres of longleaf habitat.

MAP BY MARSHA TILLETT
Source: America's Longleaf Conservation Plan

restoration initiative. The funding is being managed by the U.S. Forest Service and will be distributed to North Carolina, South Carolina, Georgia, Florida and Alabama.

North Carolina, which received close to $1.7 million of the award, plans to use the bulk of its share for plant materials capacity. This activity is focused on increasing the availability of longleaf pine seed, seedlings and associated understory plant materials for use in restoration work. In addition, a portion of North Carolina's share of the money has been set aside for education and public outreach, including the development of educational materials as well as outreach through mass media to raise public awareness. The N.C. Division of Forest Resources outlined its plans for expending the funds to the General Assembly's Joint Select Committee on Economic Recovery during the 2009 legislative session.

The Future of the Plan

The federal dollars flowing to North Carolina for restoration actions, the partnerships between federal agencies and environmental organizations, and the increased attention to this effort from the public and state policymakers are all indications that the longleaf pine ecosystem restoration effort is gaining momentum. This momentum is illustrated by North Carolina governor Bev Perdue's letter to President Obama in September 2009 in support of future funding for longleaf restoration, in which she writes, "Successful implementation of the America's Longleaf plan will meet national needs for economic recovery, environmental protection and defense readiness." This focused attention by state and national leaders on longleaf restoration efforts makes Earley's decision to focus his book on the "rise" of the longleaf forest look prophetic in many ways.

The North Carolina toast reflects the value our state has historically placed on the longleaf pine forest as a symbol of our heritage. Although the vastness of the longleaf forests that once ruled the landscape in North Carolina may be lost to the ages, hope remains that some semblance of that dominance can be restored.

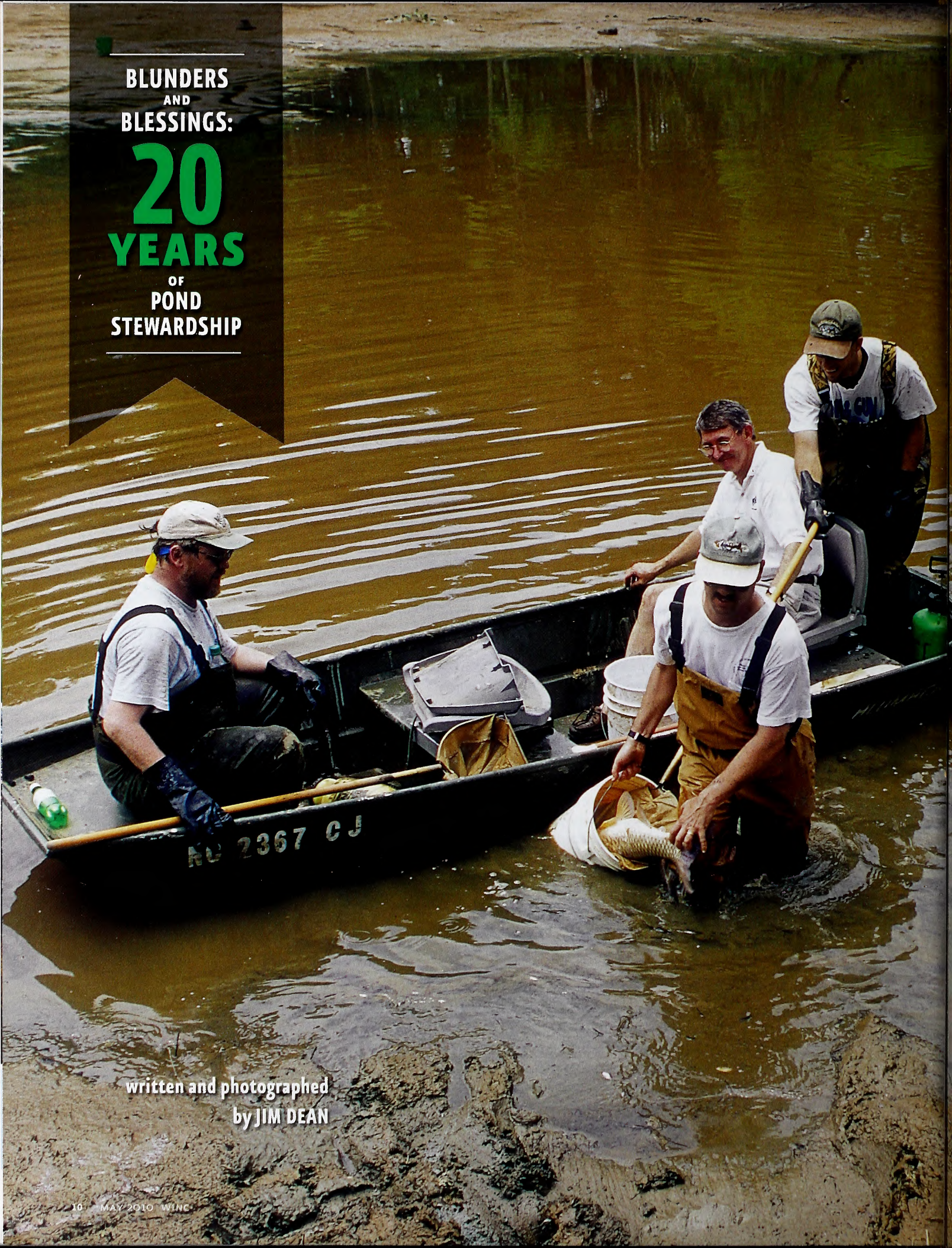
Here's to the land of the longleaf pine, The summer land where the sun doth shine, Where the weak grow strong and the strong grow great, Here's to "Down Home," the Old North State!

—the official state toast of North Carolina

Nevertheless, the task of reaching the plan's goal of restoring 8 million acres over the next 15 years remains a significant challenge. At the very least, the plan has provided a rallying point for restoration efforts and enhanced partnerships. At its best, the plan has outlined a detailed road map that points the way to the renewal of the longleaf forests that will hearken back to days gone by. ⬘

Bill Ross served as secretary of the N.C. Department of Environment and Natural Resources from 2001–2009. Currently he is a natural resources consultant for Booz Allen Hamilton and a visiting scholar at Duke University.

BLUNDERS AND BLESSINGS: 20 YEARS OF POND STEWARDSHIP



written and photographed by JIM DEAN

PART TWO

STARTING OVER

SOMETIMES, THE ONLY WAY TO IMPROVE THE FISHING IN A POND IS TO DRAIN IT AND TRY AGAIN.

Ever wonder what's really in the ponds you fish? We can make a reasonably accurate guess based on our success, or lack of it, but even if we seldom catch anything worth mentioning, we remain eternal optimists. *There must be some whoppers here that have gotten too smart to catch,* we like to think.

But is that a myth? Perhaps there's a more obvious reason why fishing is poor—or declines notably—in some ponds. Maybe those educated whoppers aren't there, if they ever were.

One thing is certain. When you drain a pond, you learn the truth. That's what we finally did with two of the ponds on our family farm, and what we found surprised me.

The fishing had become increasingly disappointing in those ponds, but there were also other issues that needed addressing. Both ponds contained undesirable species and had persistent weed problems. I had also unwisely left lots of standing timber in the upper half of the newest pond when it was built, and the dead and falling timber was a hazard, hampering weed control and other management efforts.

The dates were set to drain the ponds, beginning late that summer with the 1½-acre older pond (the second pond would be drained that winter). I began to move bass I caught from both doomed ponds to another that wouldn't be drained, hoping that this wouldn't have a negative impact. None of those bass exceeded 2 pounds, and I probably didn't move more than a dozen, but I hoped I might catch them again.

A few days before we began drawing down the water in the old pond, my friend Mary Brady and I fished an hour or so one warm, misty afternoon knowing it would be the last chance to move any more bass. To my surprise, we quickly caught five largemouths on soft plastic salamanders and worms. The biggest weighed 5½ pounds. Another weighed 4 pounds, a third was about 3 pounds, and two others weighed about 3 pounds. I wondered if perhaps I was being hasty in draining that pond, but our plans were made, and the following week a pump hooked up to a tractor began drawing down the water.

On a torrid day in August after the pond had been reduced to a 2-foot deep puddle, Rich Noble, who was professor of zoology and forestry at N.C. State University (now emeritus), and his colleague at State, Jim Rice, professor of zoology and also fisheries extension specialist, brought a group of fisheries students to the farm to collect all the fish and analyze the overall population as part of an on-the-job training assignment. It was a rare opportunity of mutual benefit. A bunch of my fishing buddies had volunteered to help, and they were equally curious about what we would find. It was hot, muddy work to drag the long seines used to collect fish. Each fish was identified, measured and counted. Finally, rotenone was applied to kill the remaining fish and finish the job.

The first surprise was the discovery of six 18- to 20-pound grass carp. At least eight years earlier, I had stocked 10 small grass carp to help control the filamentous algae. The carp had done their job fairly well, and these six had survived all that time.

But a bigger surprise concerned the bass. The largest bass was a 4-pounder, and no others exceeded 2 pounds. That meant that, in a very short time, Mary and I had caught not only the largest bass in the pond, but also the third and fourth largest. And we had simply walked the brush-choked banks, casting where there was an opening

To this jaded angler, the implications were astonishing. There were no smart 10-pound lunkers—indeed, few decent-sized bass at all. That was true despite the fact that I had been releasing bass there for years, including several between 5 and 7 pounds.

Noble and Rice noted that their analysis of the overall fish population fell within reasonable expectations for a pond that had not been fertilized or otherwise managed, especially one that also contained undesirable species. Put the five bass that Mary and I had caught back into the mix, and it was pretty much what they would have anticipated. They also pointed out something few anglers realize.

"Typically, a pond of this size (1½ acres) will have no more than about 30 adult bass at the most, and only a few of those at the top of the food pyramid are likely to exceed 3 or 4 pounds," Noble explained. "Many fishermen are surprised to learn how few keeper-size bass there are in most ponds, particularly ponds that are unmanaged."

We like to think of bass as smart and wary, but it may be more accurate to think of them as aggressive. Sure, it isn't rare to get skunked fishing for bass on some days, but when they're actively feeding, a reasonably skilled angler can usually catch them. You can easily make a big dent in a small pond's adult bass population if you keep all those you catch, overwhelming the pond's ability to recruit replacements fast enough to recover. Not only will your bass fishing suffer, you're removing predators that help keep the panfish population in check, essentially assassinating your fishing hole.

It was once fashionable to believe that it was virtually impossible to overfish a healthy bass population, but biologists have learned otherwise, and small bodies of water are particularly vulnerable. Catch-and-release bass fishing won't work miracles alone—and some ponds actually become overpopulated with small bass—but releasing bass is one of the management tools that can help you maintain good fishing, and especially when combined with the aggressive culling of panfish.

We waited until shortly after Christmas to open the gate valve and begin draining the 2¼-acre "new" pond that my family had built in 1986. On an 18-degree day in January, Noble and Rice assembled their students for another long day of seining, measuring and counting, joined again by my fishing buddies. Half-inch-thick ice hampered the use of nets and the collecting of fish immobilized by a small electrofisher. Workers periodically thawed out around a big fire built on a drained portion of the pond, and by late afternoon, the job was done.

The biggest bass found weighed only about 5 pounds, and second largest weighed 3 pounds—another big surprise for me. After all, this pond was larger and only about 15 years old at the time. During the first seven or eight years after it had been built, it had regularly yielded excellent bass fishing—lots of 3- to 5-pounders and a few in the 6- to 7-pound class every year—all of them released. But it is normal for fishing to peak in any new pond during the first half-dozen years, and then begin to decline. That decline had likely accelerated when the standing timber began to fall and the weeds got out of control. Yet, again, Rich and Jim's analysis showed that the pond's overall fish population poundage fell within expectations for an unfertilized pond.

"FERTILIZING A POND IS ONE WAY TO HELP INCREASE SMALLER FORAGE, WHILE AT THE SAME TIME INCREASING THE POND'S OVERALL CARRYING CAPACITY."

– Rich Noble

"The weight of the pond's fish (166 pounds per acre), and the ratio of bass, bluegills and redear sunfish (shellcrackers) was about what you would anticipate," Noble said. "We also found several substantial numbers of undesirable species. The reason there were relatively few large bass is because this pond lacked forage (prey) of the proper size to adequately feed smaller bass. That limited their growth, and fewer could break through that food barrier and get big enough to eat the larger prey."

"But the panfish I'd been catching seemed rather small to me," I noted, "bite-size for a 2- or 3-pound largemouth."

"Yes, but the bass that were struggling to find enough food were smaller than two pounds, and there just wasn't enough food of the right size for them," said Noble.

"Fertilizing a pond is one way to help increase smaller forage, while at the same time increasing the pond's overall carrying capacity," Noble explained. "A fertilized pond's carrying capacity might be as much as 300 to 350 pounds of fish per acre, about twice what we found in your unmanaged pond. With fertilizer, the increased biomass results in more and larger fish, and that's what many fishermen want. I'm using an exaggerated example just to make the point, but fishermen would rather have that 300 pounds divided into one-pound bluegills and five-pound bass."

"The downside is that a fertilized pond demands far more effort and attention to maintain," Rice added. "It's also hard to cull enough panfish to keep them from becoming overpopulated. If you haven't got the commitment to maintain a fertilized pond, you're probably better off not going that route." Another concern Rice pointed out is that fertilization can actually encourage the growth of undesirable weeds if it's not done properly.

As Noble and Rice would confirm, there are lots of factors that influence pond productivity, and my experience with our ponds barely scratches the surface. But one thing I learned is that there are no quick fixes, and even if you manage to "fix" a pond, you can't relax in the hope that it will stay "fixed." Fish populations in ponds are dynamic, always in flux. Indeed, a pond full of big fish is not a natural state, but an artificial imbalance maintained by fertilizer and other coordinated management practices.

With two ponds ready for renewal, I had decisions to make. I concluded that I had neither the time nor resources to maintain fertilized ponds—just too much trouble. But I still had an opportunity to make improvements. First, we hired a dozer operator to clean out the fallen timber in the large pond. While he was there, I got him to dig small catch basins to trap silt at the heads of two other ponds that had a history of muddying after any sizeable rain (they've worked great).

When the ponds had filled, I contracted with Foster Lake & Pond Management in Garner (a private management service) to restock and help manage them. Their

representative, Mitchell Morton, an N.C. State graduate in fisheries, stocked the two ponds with adult fish (bluegills, shellcrackers, bass and channel catfish) so that we could be certain what we were getting. While the fish were considered adults, you might more accurately say they were in their late teens — the bass, for example, were 8 to 12 inches long.

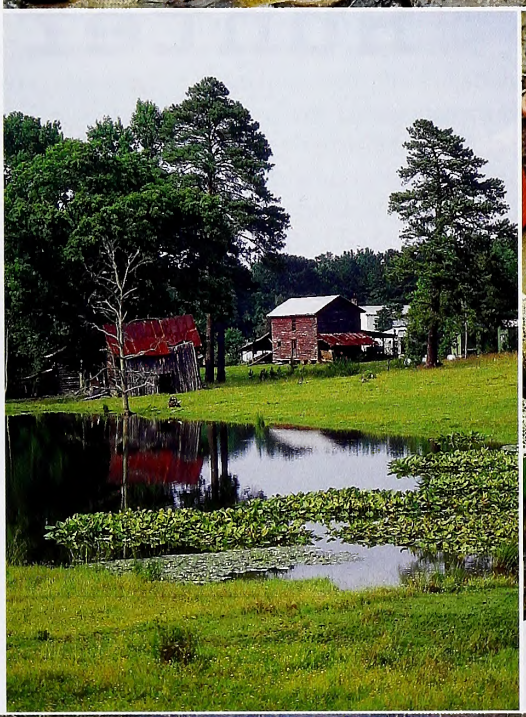
Generally speaking, the bass we caught would be released (unless we were advised otherwise), while all panfish caught would be removed. In the years since, Morton has done a good job of helping us control our weed problems with chemicals and grass carp, along with sampling fish populations and making recommendations. Because poachers had begun sneaking in and periodically stripping the ponds of many adult bass, we posted the land and registered it with the county sheriff's department. Poaching, however, is one of those problems that may never be fully contained.

Since I chose not to fertilize, I don't have ponds full of whoppers as I once envisioned, but that's OK. I have no planned experiments (thank goodness), nor any unreasonable hopes. I'm content to see what happens next, but it's clear that aquatic environments were spared by my decision not to become a fisheries biologist. If any bass and panfish grow big enough to acknowledge their appreciation, I'll be receptive.

In the final installment of this series, we will review some typical pond management procedures, and provide sources for professional advice and services. ◆

Jim Dean is the former editor of Wildlife in North Carolina *and is its longtime Our Natural Heritage columnist.*

IT WAS ONCE FASHIONABLE TO BELIEVE THAT IT WAS VIRTUALLY IMPOSSIBLE TO OVERFISH A HEALTHY BASS POPULATION, BUT BIOLOGISTS HAVE LEARNED OTHERWISE, AND SMALL BODIES OF WATER ARE PARTICULARLY VULNERABLE.



Draining two ponds allowed the author to eliminate bothersome aquatic vegetation, runty bass and dozens of panfish.

Home is the Hunter

An advocacy group for disabled sportsmen has created a program that puts wounded veterans in the field with turkey hunting guides. Good results have gotten the program on track quickly.

MELISSA McGAW/NCWRC

written and photographed by

Mike Marsh

Corporal Mike Savoie had been in situations that made his pulse race. He had served two tours of active duty during operation Iraqi Freedom. The U.S. Marine had completed four years, six months of service as a machine gunner and had been awarded two Purple Hearts as well as the Navy Achievement Medal with Valor.

"I received one Purple Heart when I was shot in the head with a 7.62 round," Savoie said, "and the second when I was wounded by an IED (improvised explosive device)."

Savoie said combat had been exhilarating. Now, he was holding only my woods-worn 12-gauge Remington 11-87, rather than his sandblasted 7.62 NATO caliber M240 SAW (squad automatic weapon). Nevertheless, his leg had been shaking so hard against my leg for two hours that the fiberglass legs of our two folding camp chairs rattled together so loudly I was afraid the clattering might spook the gobbler that had been answering my hen calls since before dawn.

Having introduced untold hunters to the sport of turkey hunting, I knew that hearing a gobbler sound off mere yards away will do that to any hunter, no matter his background or chosen profession. I still get that rush in response to hearing a gobble and hope I always do. But the pressure to call Savoie's first gobbler into range and make it an exciting hunt for him was giving me a double adrenaline jolt.

Savoie was participating in the first Wounded Warriors turkey hunt, which was held during the opening week of North Carolina's wild turkey hunting season at Lassiter Farms in Northampton County in April 2008. Lassiter Farms grows chufa, a nonnative nutgrass that turkeys love to scratch up from the soil so they can eat the tasty tubers. Lassiter Farms has branded its variety Cyprus Knee Chufa and sells it to hunters, who in turn plant it in food plots to attract turkeys.

Tentlike blinds had been set up near the chufa plantings to help increase the odds for success, and we were hunting in one of the blinds. Donny Lassiter and his father, Bobby Lassiter, who began farming in 1970 when he left the U.S. Marine Corps, had donated their property for the hunt and had helped set up the blinds, along with custom turkey call maker Jeff Wade of Oxford and Ed Mays, president of North Carolina Handicapped Sportsmen Inc.

Corporal Mike Savoie, nominated for five Purple Hearts in Iraq, took part in the first Wounded Warriors turkey hunt.

"Sponsoring a hunt is the least we can do for these service members after all they have done for our country," said Donny Lassiter. "We want to welcome them home and help them in making their transitions to civilian life. Hunting is a great way to make them feel they've returned home."

Only a few acres of the farm are dedicated to chufa propagation. Donny Lassiter said other uses of chufa, which has an almond or chestnut taste, include carp bait and a milky beverage, horchata, which is popular in Spain (see "Viva Chufa!" April 2004).

"We mainly produce the same row crops most farmers grow," Bobby Lassiter said. "But Donny has been working hard at making chufa a good fit for our farm. The chufa crop is planted and harvested in between the times we are busy planting and harvesting our other crops."

Hunting the fields

"There are a few hunters who hunt turkeys around our chufa fields, but the only time we will allow anyone to hunt over the fields will be during a handicapped sportsmen's hunt," Donny Lassiter said. "Hunting over chufa is almost too easy because once turkeys start using a field, they keep returning. We want to keep from disturbing the turkeys too much because we try to keep them in the area so we can see how they utilize the chufa. We want to be able to tell hunters how to plant and maintain their chufa plots for the best results, and the best way we can do that is through observation."

Mays, the president of North Carolina Handicapped Sportsmen, organized the hunt. He had also bought the three hunting blinds and directed their locations the day before the hunt. Lightning struck Mays while he was in the U.S. Army performing guard duty at Fort McCoy, Wis., in 1980. He was discharged due to his injuries and later diagnosed with multiple sclerosis in 1993. Now, at age 48, Mays has paralysis of his lower limbs, so he must use a power chair for mobility in everyday settings. In the field, he rides an ATV.

Mays, Savoie and a third hunter, Chief Warrant Officer 3 James Lowman, were the participating handicapped sportsmen. Lowman is a U.S. Army helicopter pilot who sustained severe injuries in an incident involving two helicopters. Much of his spine is fused together, and he suffers from other injuries to his muscles and skeletal structure.

Steve Windham, chairman of the N.C. Wildlife Resources Commission, also sponsored the hunt. Windham, Wade (owner and proprietor of Roost'em Calls) and I were the designated callers.

Windham said his formal involvement with helping disabled sportsmen through the Wildlife Commission began in December 2006. He said Mays had been networking with different people and groups to try to make hunts for handicapped sportsmen a reality.

"I met Ed at a meeting when the commission did not have a formal handicapped sportsmen's committee," Windham said. "He was one of an advisory committee of disabled sportsmen who were scattered around the state. I asked [then chairman] Wes Seegars at the December 2006 commissioners meeting if we could start a standalone committee, and he agreed we needed one. We began having special handicapped hunting opportunities, and I chaired the commission's new Disabled Sportsmen's

Committee, working closely with Ed to increase access opportunities for the disabled at commission game lands. But we also wanted to become more proactive, with more hands-on hunts involving private landowners who wanted to welcome Wounded Warriors and other disabled hunters. There had been an increasing demand for this type of quality hunt."

A deer hunt Windham and Mays hosted for Wounded Warriors in the fall of 2007 had been a success. But now they were exploring the commission's ability to host turkey hunts for disabled hunters.

Although it was not a commission-sponsored hunt, Windham said the Wounded Warriors turkey hunt was an exploratory event to see what types of situations and problems might occur with a different kind of hunt.

Logistics of a turkey hunt

"Ed had interacted with the military to coordinate a turkey hunt with the Wounded Warriors Battalion," Windham said. "We hosted a deer hunt for a couple of Wounded Warriors, one of whom was Mike Savoie, at my hunting lease in Brunswick County the previous fall, and it had worked out very well. But turkey hunting presented different logistics. Although we could help a disabled deer hunter get into an elevated stand or ground blind to wait for a deer to appear over a food plot, we needed some people who were intimately familiar with the needs of disabled hunters and who were also expert turkey hunters and callers to help make the turkey hunt a success."

When he retired from a contracting business in 2001, Mays began the program to put wounded and injured service personnel into the field. His wife, Mary, retired from a property management business at the same time.

"I could never have accomplished the things I have for disabled sportsmen without her," Mays said of his wife. "I'd worked with Paralyzed Veterans through Georgia Handicapped Sportsmen. And that's what helped get me involved again. They showed me that being in a wheelchair wouldn't stop me. But when I moved to North Carolina in 2003, I found there were only a handful of special hunt opportunities for handicapped hunters available through the Wildlife Commission.

"...Donny's father is a veteran, so he wanted to help."

Donny Lassiter (above) and father Bobby donated use of their chufa acreage for the hunt.

CONTACT INFORMATION

N.C. Handicapped Sportsmen Warriors to Woodsmen hunts are funded by raffles, private donations and fund-raisers. Major donors include the Triangle Safari Club, Wake County Wildlife Club and Paralyzed Veterans of America. For more information or to make donations, visit **www.nchandicappedsportsmen.com.**

For more information about commission opportunities for disabled sportsmen, visit **www.ncwildlife.org.**

For more information about Lassiter Farms and Cyprus Knee Chufa, visit **www.cypruskneechufa.com.**

Author and veteran turkey hunter Mike Marsh worked the box call as Savoie took his first gobbler.

"I was appointed to the commission's disabled sportsmen's ad hoc committee in 2004. Then I had the first Huntmaster hydraulic lift donated in December 2004 through Paralyzed Veterans of America, which is the only nonprofit organization chartered by the U.S. Congress. That's when I saw the need to found North Carolina Handicapped Sportsmen Inc., a nonprofit organization that not only works with the commission but also is able to take advantage of opportunities through other nonprofit organizations."

Mays said when he signed a partnership agreement in July 2006 between the commission and N.C. Handicapped Sportsmen, it was a milestone. In 2005 the organization was founded with five members. By the time the first turkey hunt took place, there were more than 200 members. Other milestones included the donation of 10 more Huntmaster lifts through a collaborative effort between the commission and N.C. Handicapped Sportsmen, with the commission donating $50,000 and his organization raising $50,000 for the purchase. That allowed a lift to be stationed in each of the nine wildlife districts, with two lifts traveling between districts.

"For the deer hunt, we were getting veterans from the Wounded Warriors program, and Steve donated his hunting lease for the hunt," Mays said. "Then I met Donny Lassiter at his Cyprus Knee Chufa booth during the 2007 Dixie Deer Classic in Raleigh. After learning from me about North Carolina Handicapped Sportsmen Inc., he gave an invitation for a collaborative effort with Lassiter Farms. Donny's father is a veteran, so he wanted to help."

Network of aid

Mays, through his efforts on behalf of Paralyzed Veterans of America and other armed services foundations over the years, had gained many friends in Washington, D.C. Through his networking, he contacted Wounded Warriors Battalions at Camp Lejeune Marine Corps Base in Jacksonville and Fort Bragg U.S. Army Post in Fayetteville. Notice of the turkey hunt was posted, and the first to apply were accepted.

"When I saw the notice, I jumped at the chance," Savoie said. "I had participated in the deer hunt, so I knew it was going to be fun. I'm originally from Louisiana, and I've hunted deer. But I had never hunted turkeys."

I became one of the makeshift guides through a call from Windham. I had hunted with Savoie during the previous fall's deer hunt and was honored to be able to hunt with him again.

We had set up a decoy in the chufa field before dawn when a big gobbler sounded off from his roost about 150 yards away, sending us scurrying for the blind without the chance to pace off shooting distances. The decoy was a mounted hen turkey I had harvested during a winter turkey season. Her removable head was held in place by a wire poked into a foam rubber neck, and her removable tail fitted into a slot in an expanded foam body.

I had been conversing with the gobbler since daylight, keeping him interested. We heard several hens fly down and move him. Despite the romantic interaction between the gobbler and his harem, I was confident he would eventually come to the chufa field, where he would notice the mounted hen. At 8 a.m., Windham called on his cell phone. "James just missed a big gobbler," he said. "There were two more with him. We're going to try to call another gobbler within range."

Later, I would hear Lowman's excited tale of how his gun barrel became entangled in an elastic interior cord that anchored the tent blind, costing him an easy 20-yard shot. It was a pair of jakes that almost cost Savoie a shot at the adult gobbler I had been working.

The jakes came into the field, where they saw the decoy and ran to it, purring aggressively all the way. Frustrated when she wouldn't mate with him, one jake kicked her tail free and then beat her sideways with his wing. The other jake grabbed her plastic snood, snapping it off and spitting it on the ground as he tried to force her to submit.

"I'd better shoot one of those jakes before they ruin your decoy," Savoie whispered. "Didn't you say it cost $300?"

But I held his gun barrel down and ran off the jakes with an agitated hen call. They acted quite surprised when the abused hen had enough backbone to "cuss them out—as far as they could tell, anyway." We laughed so hard while trying to keep the sound to ourselves that the blind was quaking.

Over the next 15 minutes, I called the big gobbler into the field. But he didn't pay much attention to the cockeyed hen. Instead, he

followed a real hen as she scratched at the far side of the chufa field, then re-entered the woods behind her.

Eventually, the gobbler gave up on the disinterested hen and came back through the woods, strutting for the tailless decoy with the upside-down head. Savoie raised his Remington when the gobbler went behind a pine tree. When he was in sight again, he had folded his fan. The marine connected with a perfect shot. We exited the tent and double-timed it to the bird.

"I knew I didn't miss," Savoie said. "That was one of the most exciting things I've ever done. It was almost as exciting as combat except that turkeys don't shoot back. I'm going to cook this turkey and share it with others in the battalion ... and I'm definitely going turkey hunting again."

In the course of the hunt, Savoie discussed his injuries, describing how he had enlisted in the Marine Corps three days after the attack on the World Trade Center. He became a machine gunner and had been in the thick of combat. "I wanted to do something positive to serve my country," he said. "I would still be in Iraq if I hadn't been wounded. It was all worth it—just a minor change in my life in exchange for a lifetime of positive changes in the lives of so many others."

A bullet penetrated Savoie's helmet, shattering his skull, but he was still able to assist four companions to safety. He later returned to duty, subsequently sustaining combat wounds four more times. He was nominated for five Purple Hearts but accepted only two.

When his Humvee was destroyed by an IED, he sustained the injuries that landed him in the Wounded Warriors Battalion, which helps wounded service members with their special needs. "The Wounded Warriors Battalion helps us until we are either ready to be discharged or return to active duty," Savoie said. "I hope I will be able to return to active duty. But I have memory and cognitive issues resulting from my wounds."

Draping his first gobbler across a fallen pine trunk, Savoie sat beside it and smoothed its fan. The marine picked up the custom Roost'em box Wade made for him and scratched out a few shaky practice yelps, listening for an answer from the surrounding forest.

Carved across the lid of the call were the words "American Pride."

"I knew I didn't miss," Savoie said. "That was one of the most exciting things I've ever done. It was almost as exciting as combat except that turkeys don't shoot back. I'm going to cook this turkey and share it with others in the battalion . . . and I'm definitely going turkey hunting again."

Mike Marsh is a freelance writer living in Wilmington and a frequent contributor to Wildlife In North Carolina.

Savoie planned to cook the gobbler and share it with some of his fellow soldiers.

Jeff Wade (center) provided calls for James Lowman (left) and Savoie.

ANOTHER RED, WHITE AND BLUE SUCCESS

After capping a successful morning hunt by harvesting a gobbler, Mike Savoie yielded his hunting blind to Chief Warrant Officer 3 James Lowman, a fellow Wounded Warrior. Lowman experienced similar success, harvesting an adult gobbler from the blind.

Ed Mays of North Carolina Handicapped Sportsmen said another Wounded Warrior took a gobbler on a hunt two weeks later, giving the disabled sportsmen's group a 100 percent success rate in 2008. No gobblers were taken during the 2009 turkey hunt, perhaps due to the delayed arrival of the breeding season. Mays said this had the gobblers "henned up."

Lassiter Farms graciously donated the use of their property for future Warriors to Woodsmen deer and turkey hunts.

GROUND SKINK (*Scincella lateralis*)

This tiny lizard, whose presence is often betrayed by a faint rustle in the leaf litter, is North Carolina's smallest native reptile.

Portraits of Diversity

PHOTOGRAPHED BY TODD PUSSER

REPTILES

North Carolina contains the most biodiversity of any temperate region in the world. This series highlights the unique diversity of life found within our state's borders, photographed against neutral backgrounds to emphasize each species' individual characteristics.

Reptiles dominated the earth for millions of years, eventually giving rise to birds and mammals. Today, a single mammal species dominates, with reptiles persisting as mere remnants of their former glory. But these remnants still reign supreme in beauty and diversity.

North Carolina boasts at least 70 native reptile species: 21 turtles, 11 lizards, 37 snakes and one crocodilian (additionally, at least three non-native lizard species may have become established). This diversity includes terrestrial, aquatic, marine, arboreal and fossorial species. It includes limbless lizards; leathery, snorkel-nosed softshell turtles; and dangerously venomous serpents with buzzers on their tails.

From the elfin ground skink stalking tiny insects in the leaf litter, to the one-ton leatherback sea turtle occasionally nesting on our beaches, reptiles play crucial roles in virtually all of our state's ecosystems. Some—like the rat snake, black racer and Eastern garter snake—are common and conspicuous, occurring in every county. Others—like the coal skink, Southern hognose snake and Eastern coral snake—are rare, peripheral or otherwise infrequently encountered.

The wary six-lined racerunner streaks across sand ridges at upwards of 20 miles per hour, while the familiar Eastern box turtle—our official state reptile—plods slowly and steadily along. Most are shy creatures, reluctant to share their secret lives. Yet in all of nature, few species are more personable than the green anole, Eastern fence lizard or bog turtle; more imposing than the Eastern diamondback rattlesnake, American alligator or common snapping turtle; or more strikingly colored and patterned than the scarlet kingsnake or spotted turtle.

While I've devoted countless hours to the pursuit and study of these wonderful creatures, few have been more rewarding than those spent afield with my longtime photographer friend Todd Pusser, and few individuals have been more successful than he in capturing the splendor of North Carolina's reptiles on camera. Todd photographed the animals in these pages against neutral white or black to emphasize their beauty without the distraction of background elements. Whether reptiles frighten, delight or merely intrigue you, these images will grab your attention.

– Jeff Beane

SIX-LINED RACERUNNER (*Cnemidophorus sexlineatus*)

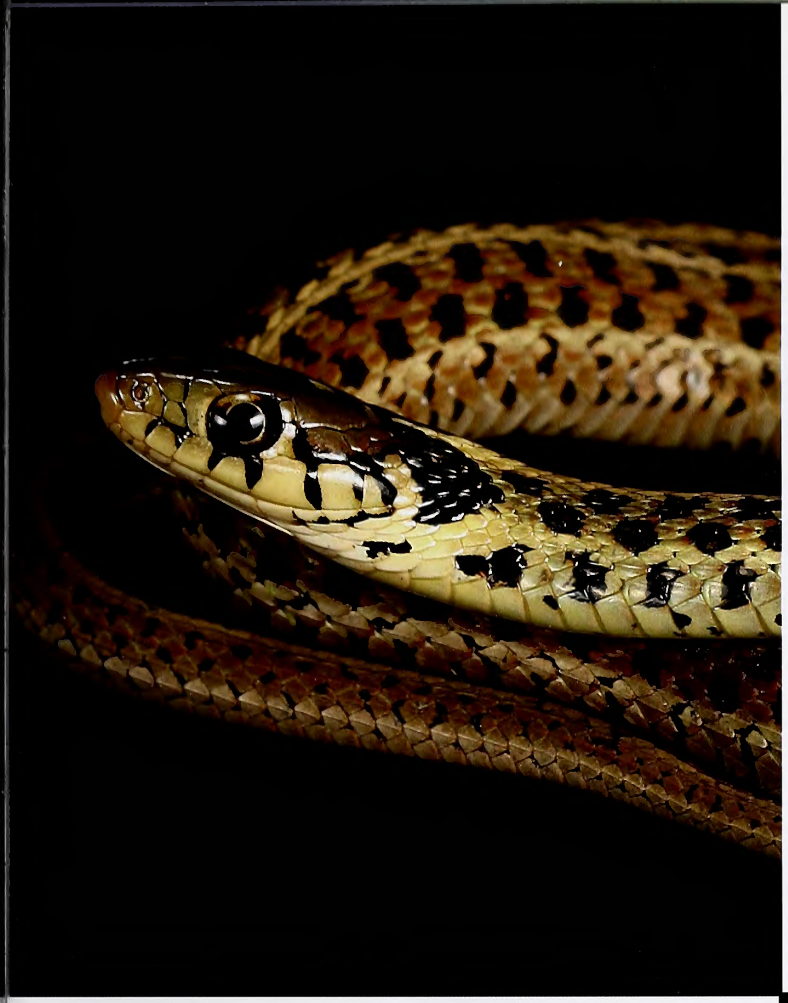
On land, at least, the heat-loving racerunner is our speediest reptile. North Carolina's only member of the family Teiidae (whiptails), it prefers open, sandy habitats.

CHICKEN TURTLE (*Deirochelys reticularia*)

This uncommon, long-necked resident of our Coastal Plain exhibits a wide array of unusual behaviors and features. A hatchling is depicted here.

BLACK RAT SNAKE (*Elaphe obsoleta*)

This large, familiar snake occurs throughout North Carolina. A powerful constrictor and a good climber, it feeds mostly on rodents and birds.



EASTERN GARTER SNAKE (*Thamnophis sirtalis*)

Named for the striped garters formerly worn by English gentlemen, this familiar, adaptable snake occurs throughout most of North Carolina.

COPPERHEAD (*Agkistrodon contortrix*)

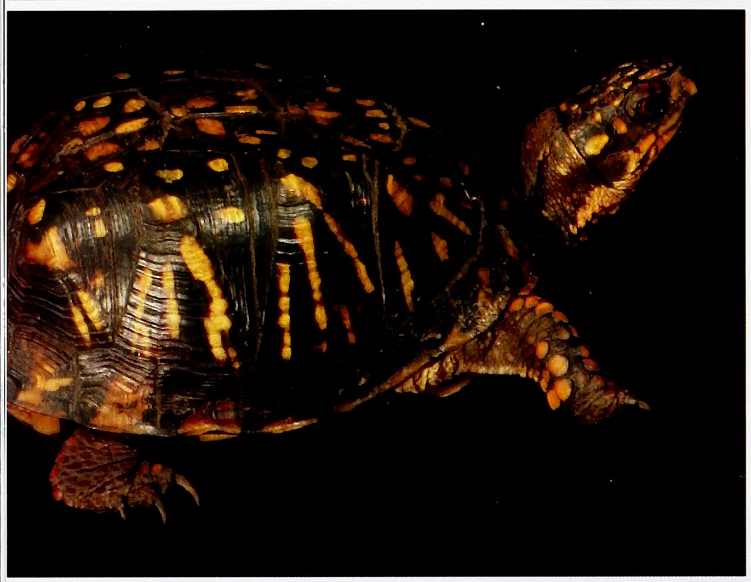
This adaptable, beautifully camouflaged pit viper is our most common and familiar venomous snake. Its bite is painful but almost never fatal to humans.

SNAPPING TURTLE (*Chelydra serpentina*)

Our largest freshwater turtle, the adaptable, irascible snapper commands respect. It occurs throughout North Carolina in a wide variety of aquatic habitats.

ROUGH GREEN SNAKE (*Opheodrys aestivus*)

Almost universally recognized as harmless, this beautiful, slender snake spends much of its time in vines and shrubs, where it feeds mostly on insects and spiders.

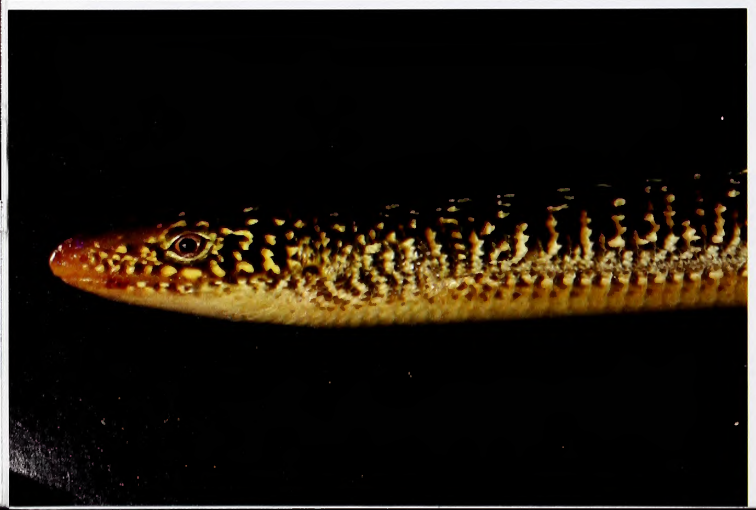


EASTERN BOX TURTLE (*Terrapene carolina carolina*)

Named for its hinged plastron, the familiar box turtle is North Carolina's official state reptile and our only fully terrestrial turtle.

SCARLET SNAKE (*Cemophora coccinea*)

This colorful burrower is most common in sandy areas of the Coastal Plain. Nocturnal and seldom encountered, it feeds mostly on the eggs of other reptiles.



MIMIC GLASS LIZARD (*Ophisaurus mimicus*)

The smallest and rarest of our three legless lizards, this recently described species inhabits savannas and pine flatwoods in our southeastern Coastal Plain.

AMERICAN ALLIGATOR (*Alligator mississippiensis*)

Our longest reptile and only crocodilian, the unmistakable and charismatic 'gator reaches its northern range limit in northeastern North Carolina. A juvenile is portrayed here.

SOUTHERN HOGNOSE SNAKE (*Heterodon simus*)

This secretive burrower inhabits sandy uplands in our Sandhills and southeastern Coastal Plain. Like many specialists, it is threatened by habitat loss and fragmentation.

EASTERN FENCE LIZARD (*Sceloporus undulatus*)

Easily identified by its keeled, overlapping scales, this common, superbly camouflaged lizard is often seen basking on trees, rocks, fences or woodpiles.

NO WORRIES ON THE UWHARRIE

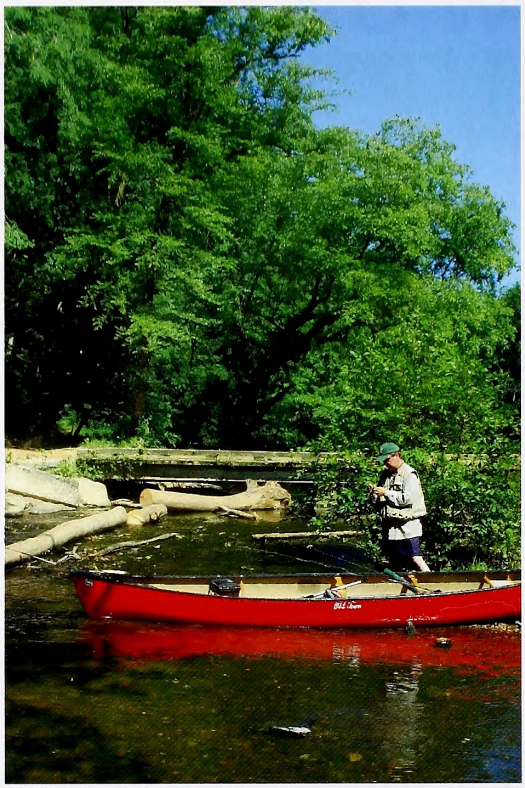
(yoo-WAHR-ee)

If you have trouble pronouncing "Uwharrie River," don't feel bad, North Carolinians for generations have experienced difficulty spelling and naming this Piedmont waterway. Pronounced *yoo-WAHR-ee*, this waterway —which begins in Randolph County and flows some 60 miles until it enters Lake Tillery— was variously known as, among other things, the Uharie, Wharee, Wharie, Uhary and my favorite, the Uoharee, before the powers that be finally settled on its present appellation some 70 years ago.

The name thing aside, there's no doubt that the Uwharrie features some enticing fishing, says Lawrence Dorsey, District 6 fisheries biologist for the N.C. Wildlife Resources Commission.

"We sampled the river in 2007 for the first time," he says. "We found a population of smallmouth bass mostly made up of fish less than 10 inches long. However, we believe there are larger fish present, but our sampling gear may not have been able to collect the bigger fish effectively. We did not collect any largemouth bass during our surveys, but I am sure they are present in the river."

WRITTEN AND PHOTOGRAPHED BY BRUCE INGRAM



While fishing the Coggins Mine Road float, Lexington's Anthony Hipps landed this smallmouth (above) on a popper, just one of several fly patterns that are successful for bass and panfish on the Uwharrie. Dragging a canoe through low water is always a possibility on some sections.

Dorsey further relates that the waterway contains viable populations of redbreast and redear sunfish. The Wildlife Commission also has collected Roanoke bass, which were probably introduced in the late 1960s to the early '70s.

Fellow biologist Troy Thompson believes that the river also has other claims to fame. "The Uwharrie is a unique fishery in this portion of the state, since smallmouth and Roanoke bass are more typical of the foothills of the western Piedmont," Thompson explains. "I have heard reports of 3-pound-plus smallmouth bass caught from the Uwharrie, but 9- to 12-inch fish are probably the norm. The Uwharrie is also known for its spring run of white bass, a rarity itself these days, although I don't think the run is as good as it used to be since the white perch became established."

Anthony Hipps of Lexington frequently floats or wade-fishes the Uwharrie and describes the fishery as a "mixed bag." Hipps has dueled with smallmouths, which were stocked in the 1970s, largemouths, Roanoke bass, white perch, crappie, yellow perch, bluegills, redear sunfish (some larger than 2 pounds) and the occasional chain pickerel. But the species he encounters more than any other is one he describes as ubiquitous throughout the river's length—the redbreast sunfish.

"I have caught smallmouth bass up to 22 inches in the river, but most will be in the 8- to 12-inch range," Hipps says. "I have also caught some nice largemouth bass, including several in the 18- to 22-inch range. The closer to Lake Tillery you paddle, the more largemouth bass you will encounter. In 2008, I caught several large Roanoke bass on wade trips, some up to 12 inches long."

Hipps concurs with Thompson that the white bass run is but a shadow of its former self. "I have fished the Uwharrie and upper Lake Tillery in the spring for the last 15 years and can sadly state that the white bass population has been decimated," confirms Hipps. "They have probably been displaced by the white perch, which are in Tillery and the lower Uwharrie in huge numbers. While the white perch is a very tasty fish to eat, the white bass is a much stronger fighter and grows twice as big. White bass are still plentiful in the lakes above Tillery, such as Falls, Badin, Tuckertown and High Rock."

Prime Floating Time

Hipps says that although the Uwharrie can easily be wade-fished throughout the warm-weather period, the best time to float the river is from April through June, providing rainfall has been sufficient. Dorsey agrees.

"I definitely would suggest spring or early summer as well, as the river does get awfully low during the late summer and early fall," he says. "I think most people float the section from the low-water bridge down to the Highway 109 bridge. Some floats may even extend down to Lake Tillery. All of these are definitely dependent on flows."

Paddlers or float fishermen who take excursions down the river will find a beautiful stream, but also one that suffers from a common problem in the state. "Most of the areas along the river are undeveloped," continues Dorsey. However, "the biggest issue, as with most other rivers in North Carolina, is sedimentation. This is typically from runoff that is funneled off the land as a result of poor or improper stream buffering."

Indeed, the first three excursions I had planned to the waterway were cancelled either because of low summertime water levels or muddy spring and early summer levels. Even when the tributaries clear, Reese Lake and Dam, which are the source of the Uwharrie River, will release large amounts of water over the dam spillways to allow the impoundment to return to normal levels. Doing so, however, can wreak havoc with river levels and clarity downstream.

Best Float Trips

As Dorsey notes, a popular float trip is from the low-water bridge off Coggins Mine Road down to the Highway 109 bridge (9 miles, number 1 to number 2 on the float map, page 31). Both access points are on river right. Paddlers should be aware that the take-out involves a steep climb up a dirt bank under the bridge. Hipps says that the pools on this junket hold numerous redbreast sunfish along with Roanoke bass, redear sunfish and some decent-size smallmouth bass. The Lexington resident adds that this excursion is a really long day in low water, and paddlers need to move hurriedly to finish before dark.

A second float is from the Highway 109 bridge to the Uwharrie National Forest access (number 2 to number 3 on the map) off a Forest Service road (Cotton Place Road) via Moccasin Creek Road and Reservation Road. This is about a 4-mile float, with the take-out on river right at a very primitive campsite. The take-out is up a steep dirt bank,

and the only clue that you have arrived there is a heavily trodden path.

The third float is from Cotton Place Road to Morrow Mountain State Park (5 miles, number 3 to number 4 on the map). This junket is on the lower Uwharrie River and includes an additional 1-mile paddle across Lake Tillery to the Morrow Mountain State Park access.

When fishing the latter trip, Hipps will sometimes access the lower river by motorboat from Lake Tillery to the first riffles and then wade-fish up the Uwharrie. Jumbo smallmouth and largemouth bass dwell in this section.

Best Fly Patterns and Lures

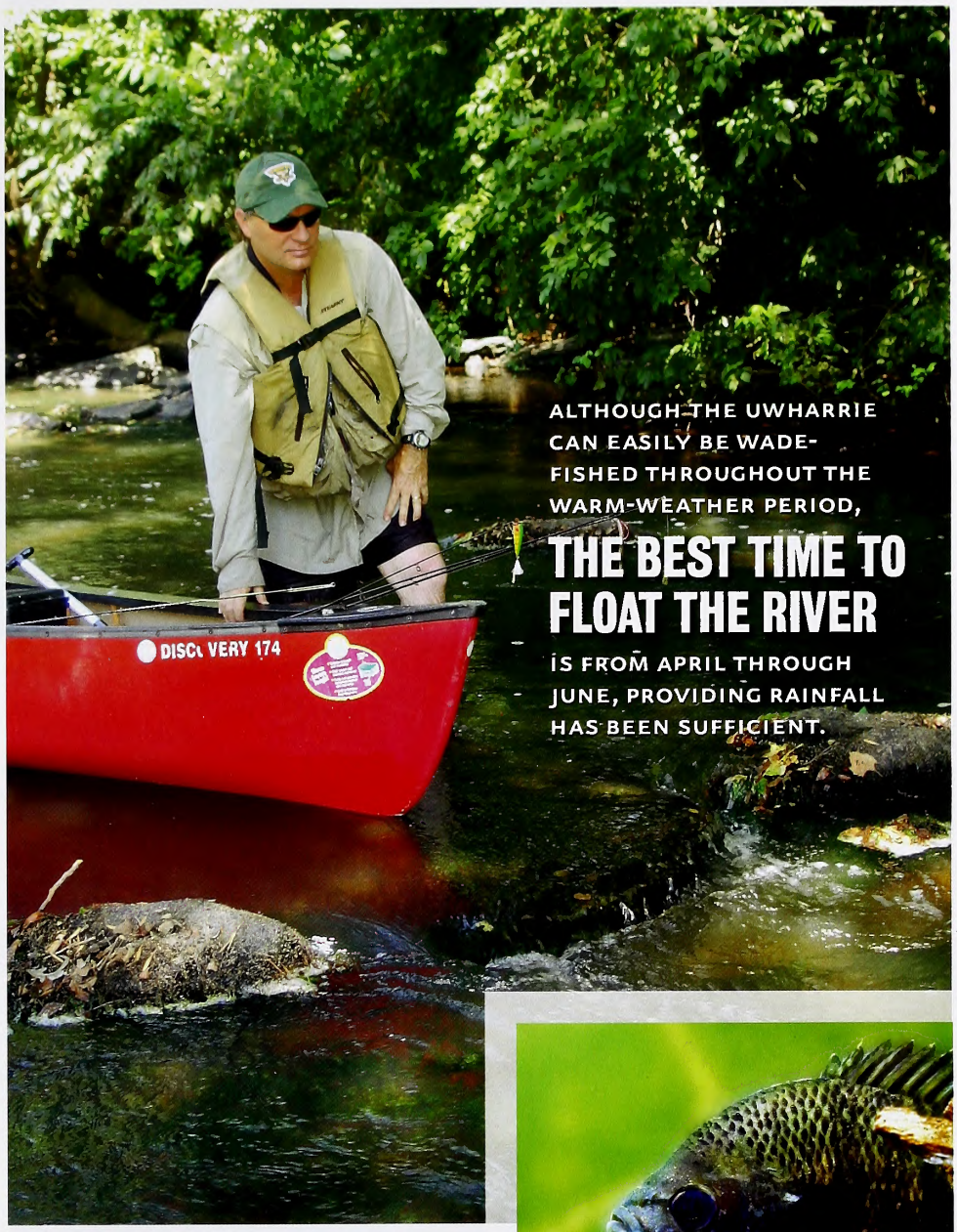
Hipps says that he has experienced success with size 6 poppers and sliders, size 4 Clouser minnows, size 6 Shenk's White Minnows, size 6 rubber-legged nymphs, and his own creation, a size 6 Hellcraw.

Regarding lures, the same artificials that work well on any upland or hill-country river in North Carolina will perform well on the Uwharrie. My standard topwater lures include Heddon Tiny Torpedoes, Phillips Crippled Killers, Rebel Pop-Rs, Storm Chug Bugs and ¼-ounce buzzbaits. Effective hard plastic baits include Rapala Original Minnows, Bandit crankbaits, Cordell Big O's and Bomber Model A's. Soft plastic favorites include 6-inch worms, 5-inch lizards, 4-inch craw worms and tubes, and 3-inch grubs.

Trip Accounts

Hipps and I went on our two-day sojourn on the Uwharrie in early July. The first thing I must say about this stream is that, as an outdoor writer, I have been assigned to float upland and Piedmont rivers throughout the mid-Atlantic. Aesthetically, specifically in regard to scenery, the Uwharrie rates with the best in the region: the Maury and Rappahannock rivers in Virginia, the South Branch of the Potomac through West Virginia's Smoke Hole Canyon, and the New River through its namesake gorge in West Virginia.

On Day 1, Anthony and I put in at the low-water bridge, and a few quick strokes with the paddle sent us away from civilization and by heavily wooded shorelines for the rest of the trip. Sycamores, sweetgums, river birches and box elders crowd the shorelines so much that a leafy canopy envelops the stream in many places. The major sign of civilization was an old cabin. That's because much of the river,



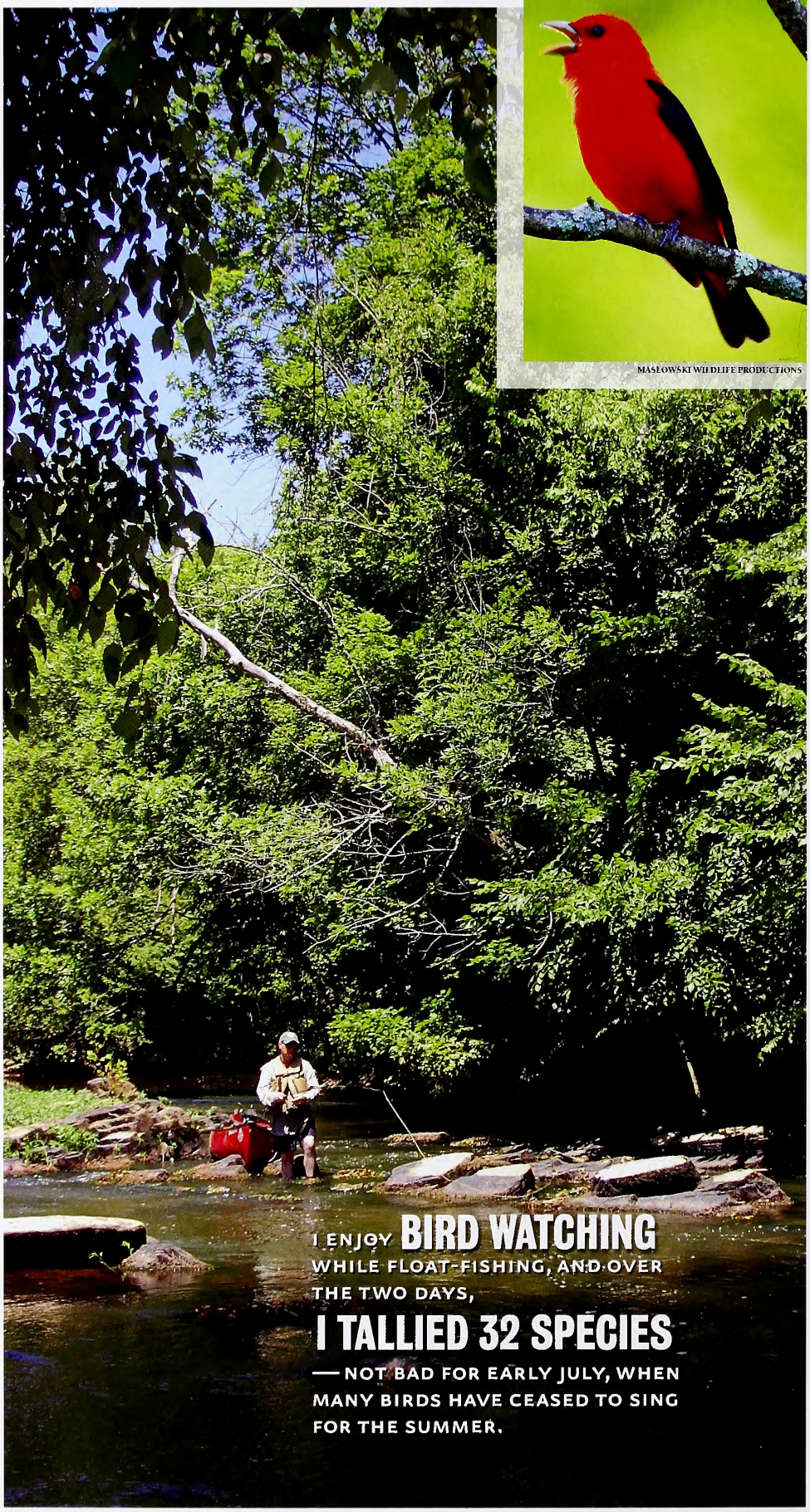
ALTHOUGH THE UWHARRIE CAN EASILY BE WADE-FISHED THROUGHOUT THE WARM-WEATHER PERIOD,

THE BEST TIME TO FLOAT THE RIVER

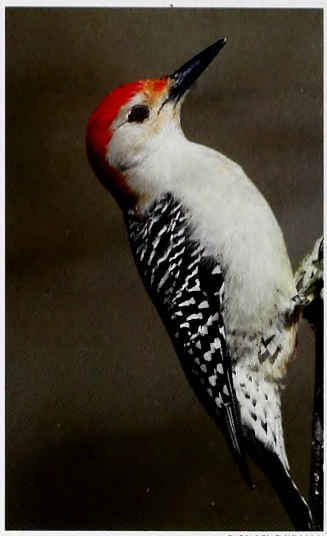
IS FROM APRIL THROUGH JUNE, PROVIDING RAINFALL HAS BEEN SUFFICIENT.

MASLOWSKI WILDLIFE PRODUCTIONS

MASLOWSKI WILDLIFE PRODUCTIONS



MASLOWSKI WILDLIFE PRODUCTIONS



F. EUGENE HESTER

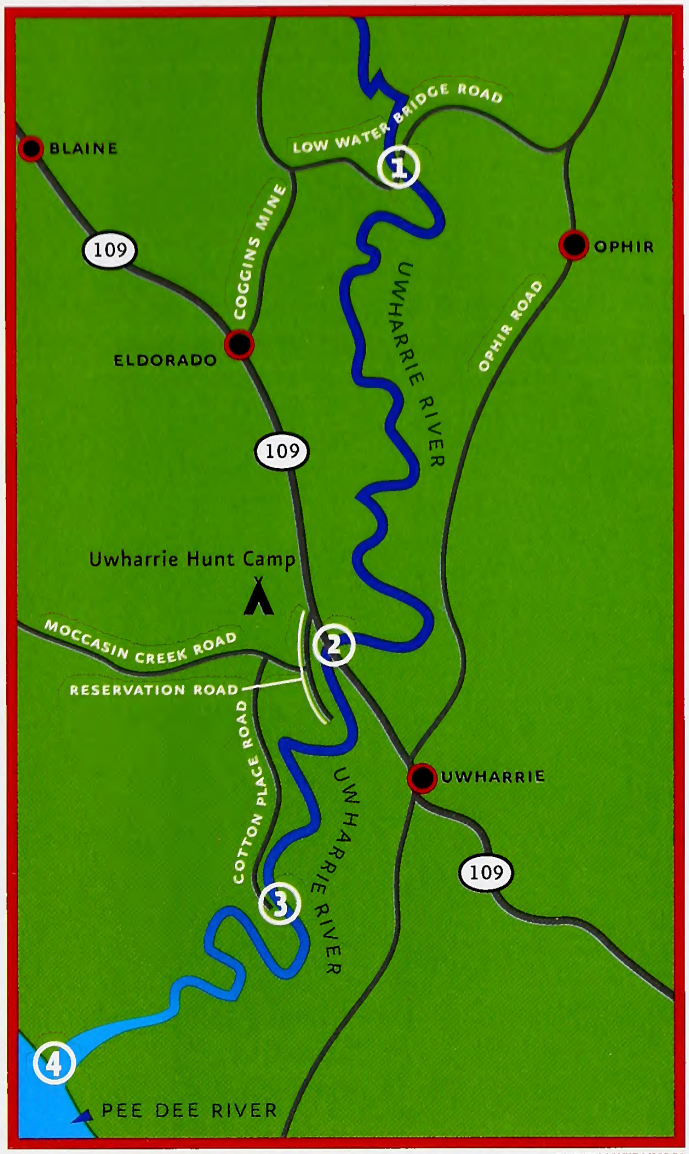
not only on this excursion but on the other two as well, flows through the Uwharrie National Forest.

I enjoy bird watching while float-fishing, and over the two days, I tallied 32 species—not bad for early July, when many birds have ceased to sing for the summer. As Anthony had predicted, we glimpsed several ospreys. But the stars, the ones that seemed to be present everywhere, were the Acadian flycatchers (their not-so-tuneful songs, which I render phonetically as *flea-check*, came nonstop) and the scarlet tanagers (their song sounds like that of a robin with a very sore throat).

Expect to hear or see such forest dwellers as tufted titmice; Carolina chickadees; Carolina wrens; wood thrushes; red-eyed vireos; blue-gray gnatcatchers; downy, pileated and red-bellied woodpeckers; and several warblers such as the ovenbird and hooded warbler. We also viewed birds that dwell on most North Carolina rivers such as great blue and green herons and belted kingfishers.

Hipps fishes almost exclusively with a fly rod, and given the frequent low-water conditions, a long rod is often the best option for the Uwharrie. Anthony caught numerous redbreast sunfish and could have caught more if he had wanted to use smaller poppers and nymphs, as this species seems to populate every pool in abundant numbers and to hold near every submerged tree, of which there are many.

Another fish that is exceptionally abundant is the longnose gar. With its long snout, which is filled with needlelike teeth, the gar is an imposing creature and looks like something out of the prehistoric period—which it is. Many times, we floated past gar that ignored us as they lay suspended just beneath the surface, periodically gulping air and waiting for some hapless minnow or sunfish to



MAP BY KRISTIE RHODES

TRIP PLANNING INFORMATION

Eldorado Outpost on Highway 109:
www.eldoradooutpost.com, (910) 572-FISH.
Offers canoe rental, horseback riding, biking and other outdoor pursuits, as well as current stream information.

Morrow Mountain State Park:
www.ncparks.gov/Visit/parks/momo/main.php, (704) 982-4402.

UWHARRIE RIVER | Best Boat Float Trips

FLOAT ONE --- 1 to 2 | FLOAT TWO --- 2 to 3 | FLOAT THREE --- 3 to 4

come by. Several times, these seemingly docile fish erupted on my topwater baits, causing wash-basin-size splashes. Thankfully, I never hooked any of the gar, as I have no desire ever to remove this species, with its barracuda-like teeth and demeanor, from a treble hook.

Our best fish was a 9-inch smallmouth that Anthony caught on a popper, and I tallied a largemouth that was a little smaller. Obviously, the river has better-size black bass in it, but the Uwharrie is definitely a body of water that you have to visit when conditions are just right. For example, a week before my arrival the stream was too high and muddy to fish, but by the time of my arrival the river had become so low that we had to debark from our canoe many times and drag it through shallow-water sections. No doubt we spooked many of the larger smallies and largemouths before we had an opportunity to cast to them.

On the second day, we put in at the Highway 109 bridge and did the short four-miler to the Uwharrie Hunt Camp. This junket is just as scenic and almost as isolated as the upstream one is. Indeed, the major sign of civilization, if you can call it that, was a cornfield. In fact, we never saw another paddler on the two-day trip, even though it came during the Fourth of July period.

The Highway 109 bridge float features deeper water, as several tributaries enter the Uwharrie, so there will be less need to drag a canoe through shallow sections. The fishing potential is greater, and I am embarrassed to admit that I lost a fine 13-inch or so smallmouth that smashed a crankbait. The fish became unhinged when it performed one of those classic smallmouth leaps. One obstruction exists on this float—the remains of a dam that dot the river not far below the put-in. The best pathway is on far river left, where a chute and a Class I drop exist.

A highlight of this getaway was watching a Northern water snake wend its way across the surface. The snake held a bullhead catfish crossways in its mouth, indicating that it had experienced a very successful morning of fishing. Another highlight was observing all the painted turtles that lay basking on the tips of downed trees. On no trip to any river this decade have I seen as many painted turtles. Also of note is that, although we finished our float around 10:30 a.m., the sun still had not penetrated the luxurious canopy that envelops this section of the river.

Does the fishery on the Uwharrie compare with that of such better-known North Carolina rivers as the New, French Broad and Nolichucky? Of course not. But the Uwharrie is very much worth a visit from all those who enjoy birding, paddling, fishing and photographing our streams. ◆

Bruce Ingram is the author of "The New River Guide" ($18.25) and "Fly and Spin Fishing for River Smallmouths" ($19.25). To purchase a book, contact him at bc_ingram@juno.com.

Equipped with a stellar sensory system, tweezing teeth and powerful paddle-shaped paws, here comes the

Sensational Star-nosed Mole

text, illustrations and nature activity by Anne M. Runyon

Foraging through the moist soils and shallow fresh waters of North Carolina's mountains and Coastal Plain, this energetic predator hunts both night and day for a variety of worms, insects, crustaceans and small fish.

ANCIENT ORIGINS AND RECENT DIGS

Fossil records found in North America and Europe suggest that the star-nosed mole (*Condylura cristada*) developed from ancestral Eurasian talpids (or moles) 30 million years ago. It is likely that this unique mole migrated across the Bering Strait land bridge to North America about 700,000 years ago. This was long after the ancestors of our other talpid species had arrived and burrowed into different habitats across the continent. This semi-aquatic mole is extinct in Europe and Asia.

The star-nosed mole is currently found from Nova Scotia southwest across Canada into northern Minnesota, all across the Great Lakes region and down the Atlantic coast from New England to Georgia. Northern star-nosed moles are larger than southern ones, but within each local area, the sexes are about the same size. North Carolina's star-nosed moles are about the size of a pet hamster.

The Eastern mole is the largest of the three species of moles found in North Carolina and has the biggest front feet.

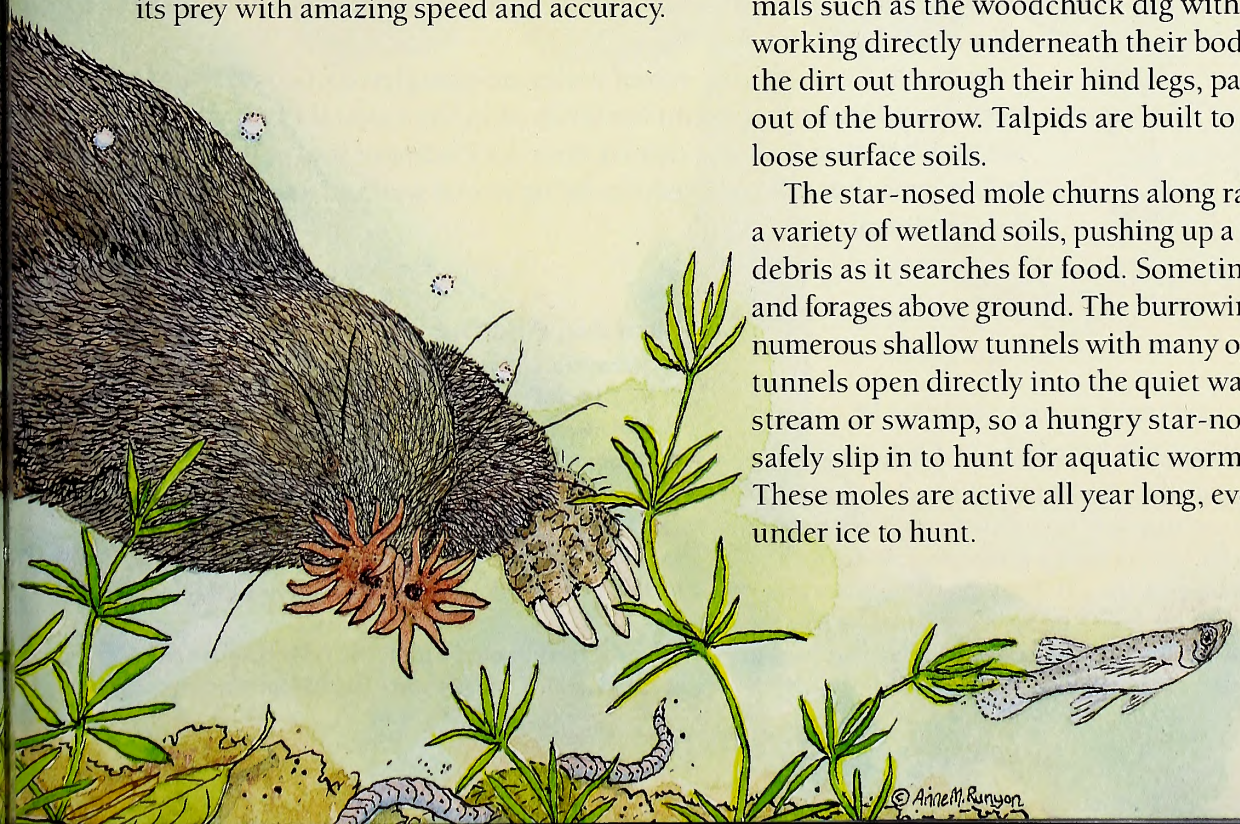
The hairy-tailed mole lives in North Carolina's mountains.

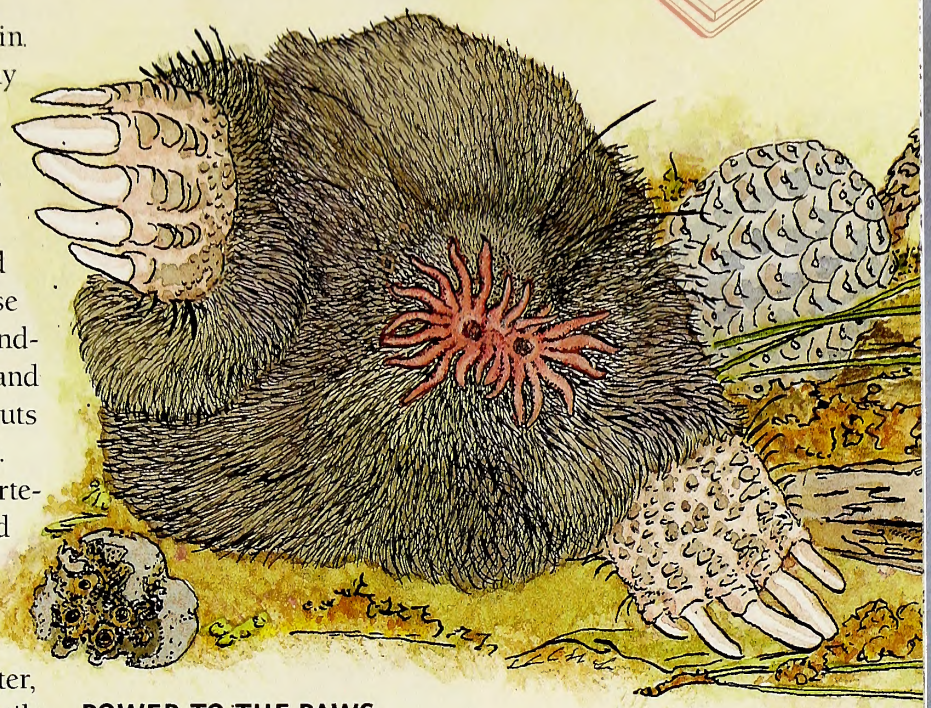
All moles have tiny eyes, no external ears and velvety soft fur. Each hair can bend both backward and forward. The star-nosed mole has a thick winter coat, frosted with white, and a sleek, darker summer coat.

TWITCH AND TINGLE

All talpids have furless snouts with special sensors in the skin called Eimer's organs, and they all grow many vibrissae (sensory hairs) on their heads. Because these mammals live most of their lives burrowing underground in the dark, vision is not as useful for navigation as is their sense of touch. A constant stream of information about what they touch, and where they are, flows rapidly to the brain from these sensitive tactile organs, creating a detailed understanding of their world. Humans open up their eyes to see and understand the world. Moles thrust forward their snouts and twitch their vibrissae to feel and understand it.

Star-nosed moles evolved the ability to hunt invertebrates in the soil, just as the Eastern and hairy-tailed moles do here in North Carolina. However, this talented mole also forages for tasty worms, insects and small fish found in shallow wetland waters. To thrive in both habitats, underground and underwater, the star-nosed mole developed the most elaborate tactile sensory system of any living talpid. Each baby mole begins life with a delicate pink star bundled on the tip of its snout. This nose star unfolds and grows into twenty-two fleshy probes, all packed with Eimer's organs. The star-nosed mole also grows numerous vibrissae on its head, along the edges of its big front paws and scattered around the base of its long tail. These extraordinary sensory organs help the mole to navigate and hunt underwater, catching and identifying its prey with amazing speed and accuracy.





POWER TO THE PAWS

Like all talpids, star-nosed moles have broad paddle-shaped front feet with five strong scooping claws. Thick, bumpy skin protects these paws as they dig. Moles also have unusually large and powerful front legs. Wide bones support huge muscles, and these bones are structured to enable the mole to burrow with powerful unique motions, pushing the soil sideways with one front paw at a time. As it digs, the mole also pushes itself forward with its hind feet. Most burrowing mammals such as the woodchuck dig with their forelegs working directly underneath their body. They scrape the dirt out through their hind legs, pause and kick it out of the burrow. Talpids are built to swim through loose surface soils.

The star-nosed mole churns along rapidly through a variety of wetland soils, pushing up a telltale ridge of debris as it searches for food. Sometimes it emerges and forages above ground. The burrowing mole creates numerous shallow tunnels with many openings. Some tunnels open directly into the quiet waters of a small stream or swamp, so a hungry star-nosed mole can safely slip in to hunt for aquatic worms and insects. These moles are active all year long, even swimming under ice to hunt.

DIGGING DEEP

Star-nosed moles also dig deep tunnels, burrowing 2 feet down into well-drained soils. Unable to push their way through this deeper soil, they excavate and bring the soil up to the surface, where it forms a molehill. They will burrow under a log or rock to create cozy nests cushioned with dead leaves and grasses. They also use these deep tunnels to hunt in winter when the surface is frozen.

Most moles live fairly solitary lives, but star-nosed moles seem to be more gregarious, sometimes sharing adjoining tunnels. After pairing in the winter, star-nosed moles mate in the spring. Females usually give birth to five hairless babies which grow rapidly and leave the nest to forage independently after about a month. Star-nosed moles mature quickly and can breed when about 10 months old.

ROLE OF THE MOLE

Like all of our native mammalian insectivores (shrews and moles) star-nosed moles eat voraciously, consuming great quantities of insects, worms and other small prey. They aerate soggy soils by burrowing where other moles will not dig, and they provide food for many larger predators. Research on the development of their remarkable star-nose is contributing to our understanding of how complex mammal brains develop.

In North Carolina, star-nosed moles are considered uncommon. Most have been found in our mountain lowlands or in the Coastal Plain where the soils are moist or muddy. A few reports from the Piedmont hint at wider distribution in our state, but as for all species living in our wetland areas, protection from habitat destruction is vital.

Get Outside

Star-nosed moles are rare in North Carolina, but Eastern moles are very common in many of our back yards. Although you might not see the mole itself, spotting mole tunnels is not difficult. Look for raised ridges in the leaf litter or along a grassy place. When walking, pay attention to a softness in the soil. There may be a surface tunnel underfoot where a mole has been hunting. If you do see a mole above ground, watch how quickly it disappears as it digs its way back to safety underground!

Read and Find Out

- "Mammals of the Carolinas, Virginia, and Maryland" by W. David Webster, James F. Parnell, and Walter C. Briggs, Jr., University of North Carolina Press, 1985.
- "Moles and Hedgehogs: What They Have in Common" by Sara Swan Miller, Franklin Watts, 2001.

In *Wildlife in North Carolina:*

- "Life in the Dark Lane" by Jane Rohling, May 1985.

Find out more about Project WILD Workshops and literature at the Wildlife Commission's Web site at www.ncwildlife.org

Make A Hungry Star-nosed Mole and Worm Sculpture

A hungry star-nosed mole dives into a slow stream, hunting for his favorite prey. He feels his way along the mucky bottom with the fleshy probes on his snout. His star touches an aquatic worm. He snags it with his sharp teeth, hauls it up to shore, and feasts.

1) Cut out box and carefully fold mole in half.
2) Cut out mole, following thick black lines on his right side and then unfold him.
3) Cut out worm and set aside.
4) Gently bend down along ···· lines on back and shoulders, sculpting mole's body.
5) Fold legs forward along ···· lines, while tucking body under at ---- lines.
6) Secure legs with tape on underside, and gently round mole's body with fingers.
7) Fold tail down at ···· line, then up at ---- line.
8) Fold both ···· forehead lines down, creating a valley, and glue shut.
9) Fold both chin ···· lines down, then overlap both chin flaps and glue together.
10) Gently bend star open and place worm in your hungry star-nosed mole's mouth.

This activity may be downloaded at www.ncwildlife.org, the magazine page, and copied for educational purposes.

Beasley Center Sues To Stop Gill-netting

The Karen Beasley Sea Turtle Rescue and Rehabilitation Center has filed a lawsuit in federal court asking the State of North Carolina to stop authorizing gill net fishing in violation of the Endangered Species Act (ESA).

The lawsuit cites studies by the National Marine Fisheries Service, the National Oceanic and Atmospheric Administration, and the N.C. Division of Marine Fisheries (DMF) that have found gill net fishing in North Carolina waters results in the injury and death of sea turtles protected by the ESA. The suit was filed in the U.S. District Court for the Eastern District of North Carolina.

The suit alleges that defendants DMF, the N.C. Marine Fisheries Commission and DMF director Louis Daniel have issued permits and licenses that "have resulted in the illegal take of estimated thousands of protected sea turtles over the previous decades, and continue to result in the illegal take of protected sea turtles today."

Michelle Nowlin, supervising attorney for the Duke Environmental Law and Policy Clinic, which represents the Beasley Center, said the lawsuit asks the state to enforce existing laws.

KEN TAYLOR/NCWRC

"Our client is asking North Carolina to enforce the law to aid the recovery of these threatened species," Nowlin said. "We value the rich history of commercial fishermen and fishing communities in our state. However, gill nets are a destructive gear and the prevailing method of use injures and kills sea turtles and threatens their existence.

"Almost every Atlantic state with significant sea turtle populations has banned or severely restricted these nets in areas where sea turtles nest and forage, proving that commercial fishing can prosper without this harmful technology. After years of trying to address these problems through regulatory channels, sea turtle populations continue to decline. We must ask the court to enforce the law so that sea turtle populations may recover to the point where the legal protections afforded by the Endangered Species Act are no longer needed."

All of the five sea turtle species found in North Carolina waters are designated as either threatened or endangered under the ESA, according to the U.S. Fish and Wildlife Service. After hatching on the beach, sea turtles spend the rest of their lives in the water, traveling ocean currents and foraging for food. They face a variety of threats, from habitat damage caused by polluted runoff to direct injury and death from being hit by motorboats and ships. Gill nets constitute one of the biggest threats: Sea turtles caught in the nets are trapped underwater, and they typically drown or suffer severe lacerations while struggling to free themselves.

MELISSA MCGAW/NCWRC

The Karen Beasley Sea Turtle Rescue and Rehabilitation Center claims in a lawsuit that gill-netting is a violation of the Endangered Species Act because the nets kill and injure sea turtles.

e NEWSLETTER
Get N.C. Wildlife Update—news including season dates, bag limits, legislative updates and more—delivered to your Inbox from the N.C. Wildlife Resources Commission. Sign up at www.ncwildlife.org/enews.

Wildlife Artists Unveil Core Sound Show

The North Carolina Wildlife Artist Society will hold its first exhibition, "Portraits of Wild North Carolina," through May 30 at the Core Sound Waterfowl Museum on Harkers Island.

The society is a relatively new group spearheaded by Carteret County artist Kyle Dixon. Within the organization's first year, approximately 30 wildlife and nature painters, sculptors and photographers have come together to offer some of North Carolina's finest art. Among the members of the society are Duane Raver of Garner, former editor of *Wildlife in North Carolina* magazine; former N.C. Ducks Unlimited artist of the year Mike Helsabeck of High Point; and J.P. Edwards of Smithfield, the winner of the 2009 Nevada duck stamp contest and the 2010 Michigan duck stamp contest.

Dixon not only wanted to have an expanded venue for wildlife art, but wanted to see regular exhibits being held to educate people about wildlife and nature through art. Ultimately, the society is interested in offering funding for special scholarships and creating a presence within school systems to educate children about wildlife and art.

The society considers it a mission to discover as many exhibition and educational possibilities in order to reach both collector and admirer. The group plans day trips to preserves during migration to learn about waterfowl and their habitat, as well as to get to know fellow artists. There is always a tip on technique or a tidbit about a particular species to be gleaned.

The N.C. Wildlife Artist Society invites any artist interested in joining to go online at www.ncwas.com to see the artists and gallery, and to e-mail info@ncwas.com for more information. The society also invites any organization or individual who would like to become a corporate or student member to join in helping support the cause.

ARTWORK BY DUANE RAVER

Questions — and Answers — About the New Rulemaking Cycle

The N.C. Wildlife Resources Commission will hold its annual public hearings on rules changes for the 2011–2012 hunting and fishing seasons in September this year. Following are questions and answers to help understand the reason for the change.

Q: Why did the Wildlife Commission change the rulemaking cycle?

A: Adoption of rules on an annual basis is critical to meeting the commission's conservation objectives. Prior to these changes, delayed implementation of rules hindered our rulemaking cycle and created confusion for our constituents. By adjusting the annual rulemaking cycle, we can better ensure timely adoption of rules, while providing better service to North Carolina citizens.

Q: Has the commission changed the rulemaking cycle before?

A: Prior to the 1980s, inland fishing and hunting regulation proposals were developed on separate schedules. Public hearings were conducted in September for inland fishing regulation proposals and in April for hunting regulation proposals. In 1983, the commission integrated the schedules and conducted a single set of public hearings in March. Several years later and as a result of changes in the Administrative Procedure Act, the commission moved the hearings to January to ensure that regulations could be implemented prior to hunting and trapping seasons.

Q: How will this change affect me?

A: The rulemaking cycle changes may not be noticed by the majority of the two million hunting and fishing license holders in North Carolina. However, since the new cycle necessitates holding our annual public hearings during September, those who participate in public hearings will need to plan their schedules each year to attend in September, instead of January.

Q: How does this change benefit me?

A: Anglers and hunters will benefit by knowing that the commission will be able to enact rules in a timely manner and have reasonable expectations that regulations approved by the commission after public hearings will not be delayed for an additional year.

Q: Can I still comment on the commission's proposed rules?

A: Feedback from our constituents is critical to our rulemaking process. We will continue to provide a variety of public input options — online at www.ncwildlife.org, in writing, and face-to-face opportunities — and notify constituents of the comment period well in advance of the start of the public hearings.

Q: Will this change give the Wildlife Commission time to develop all the proposals it would like, or will we see fewer proposals at the September public hearings?

A: Over the coming months, commission staff will consider public comments for rule changes received during the past year and the recent public hearings. The time staff has to develop and evaluate new proposals will be limited only for the 2011–2012 regulatory cycle.

Q: When will fishing, hunting and trapping proposals presented in September go into effect?

A: Adopted proposals will go into effect for the hunting and trapping season of the following year. This means that any proposal adopted by the commission in the fall of 2010 would become effective for the 2011–2012 seasons.

Q: Does this mean there will be public hearings again this year in September?

A: Yes.

Q: When will the new public hearing dates be available?

A: The September public hearings schedule will be available July 1, 2010, and distributed through statewide media outlets, our e-newsletter (N.C. Wildlife Update), here in the magazine and posted on our Web site, www.ncwildlife.org.

Q: When will the 2010–2011 season dates be available?

A: With the exception of webless migratory game birds and waterfowl, season dates will be available Aug. 1, 2010, online at www.ncwildlife.org.

Q: Will this change the effective dates of the big game harvest report card?

A: Big game harvest report cards will remain effective July 1 to June 30.

Q: How will this change affect regulations that are challenged by the 10-letter rule?

A: This change will accommodate deadlines established by the state Rules Review Commission for rule filing and administrative review. Further, it will provide a schedule for legislative review by the General Assembly for regulations challenged by the 10-letter rule within a one-year cycle.

CALENDAR OF EVENTS

SATURDAY–SUNDAY, MAY 1–2

Buy, sell or trade at the Dixie Gun & Knife Classic in the Jim Graham Building on the N.C. State Fairgrounds in Raleigh.
Visit www.dixiegunandknifeshow.com.

FRIDAY–SUNDAY, MAY 28–30

Explore the paleontology of the Coastal Plain at the 17th annual Aurora Fossil Festival in Aurora.
Visit www.aurorafossilmuseum.com.

SATURDAY–SUNDAY, MAY 29–30

Experience the seventh annual White Squirrel Festival in Brevard.
Contact (828) 884-3278.
Visit www.brevardnc.org.

Readers should check with the contact listed before traveling to an event. Items for listing should be conservation-oriented and should be submitted at least four months in advance to jim.wilson@ncwildlife.org, or call (919) 707-0177.

IN SEASON

This month, these seasons are open in North Carolina:

Hatchery Supported Trout Waters:
Through Feb. 28, 2011.

Wild Turkey (Male or Bearded Only):
Through May 8.

There is no closed season or bag limit for groundhog, coyote, striped skunk and nutria. There is an open season for taking beaver with firearms during any other open season for the taking of wild animals.

Check the *2009–2010 North Carolina Inland Fishing, Hunting and Trapping Regulations Digest* for bag limits and applicable maps or visit www.ncwildlife.org.

Magazine Study Finds Significant Subscriber Loyalty

A study completed in late 2009 reveals that most *Wildlife in North Carolina* subscribers enjoy the magazine, many have subscribed for long periods of time, and a significant number have given *WINC* subscriptions as a gift. The study included mail surveys sent to three separate groups: current subscribers, former subscribers and licensed hunters and anglers who do not subscribe to the magazine.

When asked if they plan to continue subscribing to the magazine, 93 percent of current subscribers said yes. The study also found that 29 percent of current subscribers have subscribed for more than 20 years, and 34 percent have given gift subscriptions.

When asked who they thought the magazine's audience should be, more than 80 percent of current and former subscribers (including those who hold a hunting or fishing license) responded that it should be all individuals interested in North Carolina's wildlife. Current and former subscribers' five highest-rated magazine article topics were threats to fish and wildlife, threatened and endangered species, coexisting with wildlife, game fish species and freshwater fishing.

Of hunters and anglers surveyed, 80 percent had heard of the magazine, 66 percent had read it and 24 percent had subscribed to it in the past. Hunters and anglers' five highest-rated topics were places to fish in North Carolina, freshwater fishing, threats to fish and wildlife, game fish species and fishing equipment.

In late 2008, citing declining subscriptions and other financial concerns, the N.C. Wildlife Resources Commission launched the yearlong study project using agency staff. Magazine editor Greg Jenkins worked with human dimensions biologists Kerry Linehan of the Division of Inland Fisheries and Dain Palmer of the Division of Wildlife Management to plan and conduct the study.

This study marked the first time since 1989 that the magazine conducted readership research. Read the full report online at ncwildlife.org/winc/documents/study.pdf.

Lab Once Again Top Dog

For the 19th consecutive year, the Labrador retriever is the most popular purebred dog in America, but could this be the last year for the Lab's reign?

According to American Kennel Club (AKC) 2009 registration statistics, the German shepherd overtook the Yorkshire terrier last year and is now ranked second most popular in the nation for the first time in more than three decades.

An American favorite since the time of Rin Tin Tin, the German shepherd became the number one breed of the 1920s, but then slipped in popularity until after World War II.

"Labs have been America's top dog for nearly two decades due to their loyal and gentle nature," said AKC spokesperson Lisa Peterson. "But the German shepherd dog has gained ground recently, quite possibly due to the increased attention they receive for their security efforts at home and abroad."

CHIP LAUGHTON

TOP 10 BREEDS

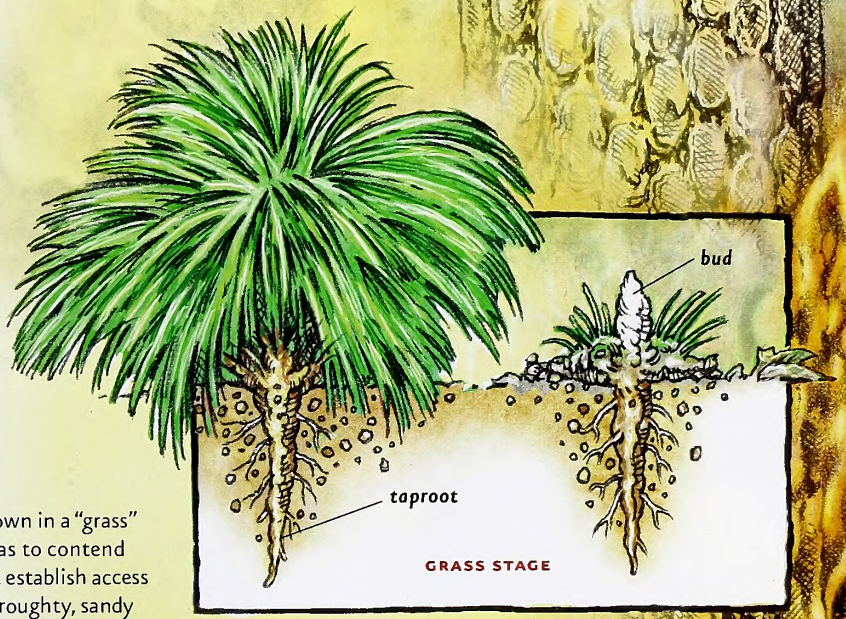
1. Labrador retriever
2. German shepherd
3. Yorkshire terrier
4. Golden retriever
5. Beagle
6. Boxer
7. Bulldog
8. Dachshund
9. Poodle
10. Shih Tzu

How Are Longleaf Pines Adapted To Fire?

written by Clyde Sorenson
illustrated by Jim Brown

LONGLEAF PINES HELP DEFINE the character of Southeastern savanna lands like the Sandhills. Longleaf pines are exquisitely adapted to the fire-maintained ecosystems they dominate so conspicuously.

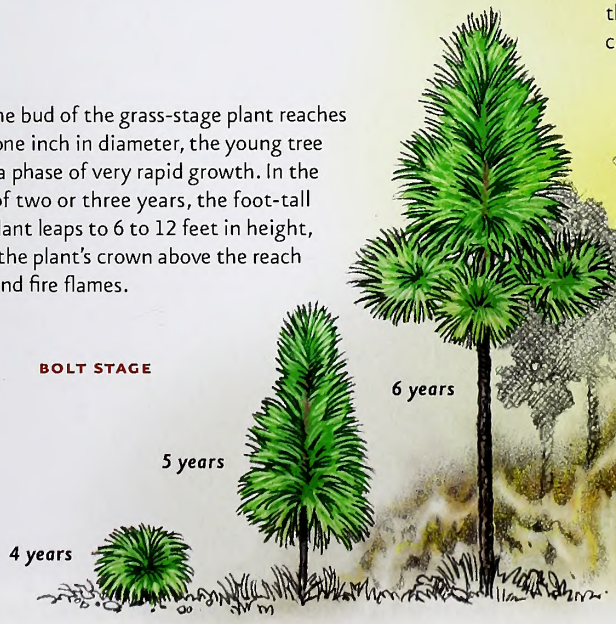
Longleaf pine seeds require mineral soil for germination, so they sprout most abundantly after a burn reduces soil duff.



Once the seedling emerges, the plant hunkers down in a "grass" stage for several years. The seedling not only has to contend with the potential for frequent fires, it also must establish access to a reliable water supply in what are typically droughty, sandy soils. During the grass stage, the plant devotes most of its energy, therefore, into driving a taproot deep into the soil to assure that water supply.

The top of the plant develops a dense, bushy crown. When a low-intensity ground fire comes by, the needles may burn off, but they protect the bud tucked deep inside. The grass stage can last from 3–5 or more years.

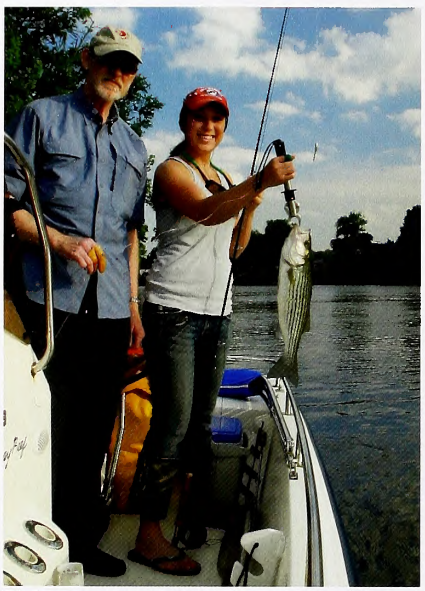
Once the bud of the grass-stage plant reaches about one inch in diameter, the young tree enters a phase of very rapid growth. In the space of two or three years, the foot-tall grass plant leaps to 6 to 12 feet in height, lifting the plant's crown above the reach of ground fire flames.



As the tree continues to grow, it develops a thick layer of platy, fire-resistant bark, making the tree capable of withstanding all but the hottest fires. Over its potential lifespan of 400 years or more, a lucky longleaf growing in the right spot could see a hundred or more fires pass harmlessly beneath its boughs.

Paradise River

written by Jim Dean



JIM DEAN

The boat swung sideways across the current until the electric motor pulled the bow around facing upstream and we began to drift down the Roanoke River below Weldon. David Fussell was already casting, but I was not quite ready. Every time I return to fish this river, I have one of those pinch-yourself moments. The long winter is truly over, the striped bass are back, and so am I.

There were boats everywhere, and everyone was fishing. In the distance downriver, I could see the big rock and the submerged ledges around it. A mile or so upstream at the boat ramp where we had launched, the rapids are impassable except on high water. It was all so wonderfully familiar, and yet this is not the same river I have fished since I was a child over half a century ago. Oh, it's the same place; it's just so remarkably different. But reminiscence would have to wait because David was hooked up.

"Not very big," he remarked, "maybe 2 pounds. Why are you waiting?"

"The long winter is truly over, the striped bass are back, and so am I."

Why, indeed! I made a few false casts and shot the weighted fly line towards the bank where it carried the fly deep, and I began to retrieve in short snatches. The strike came just as the fly began to swing, a solid thump followed by a burst of speed that yanked a hot burn of line through my fingers—it hurt so good.

David and I were not surprised, however, when our immediate success didn't foreshadow one of those memorable 100-fish days because it was still early in the season. Even so, we managed to catch about 25 of the smaller early-run bucks—actually David caught most of them, as usual. Later in April and into May, the fishing would improve with more of the bigger females in evidence, and "fish fights" erupting around the boat as dozens of male stripers thrashed the surface mating with fertile females.

Even during the peak of the spawning run, the fishing can be indifferent one day and fantastic the next. Several years ago, Harry Bailes and I fished an entire morning in early May with little success. It was 12:30 and getting hot, and many other boats had already called it quits. We were thinking of leaving since we expected the fishing to be poor at least until late afternoon.

But we pulled into one more spot and decided to anchor rather than drift. To our delight we began to catch fish immediately, and some were bigger. Harry landed one that weighed 7 pounds. For several hours, we caught fish on nearly every cast until our hands were raw from releasing them.

"What are you doing?" Harry asked me when he noticed I had stopped casting.

"I'm afraid if I cast again, I'll hook another one," I sighed. "I need a break."

Every time we caught our breath enough to try it again, an eager striper was waiting. Finally, in mid-afternoon, we pulled in the anchor and headed for the landing. I don't know how many we caught, but it is one of the few times in my life I've ever left fish that were still eating. That's a no-no, and I suppose St. Peter, himself a fisherman, will ask me to explain it some day.

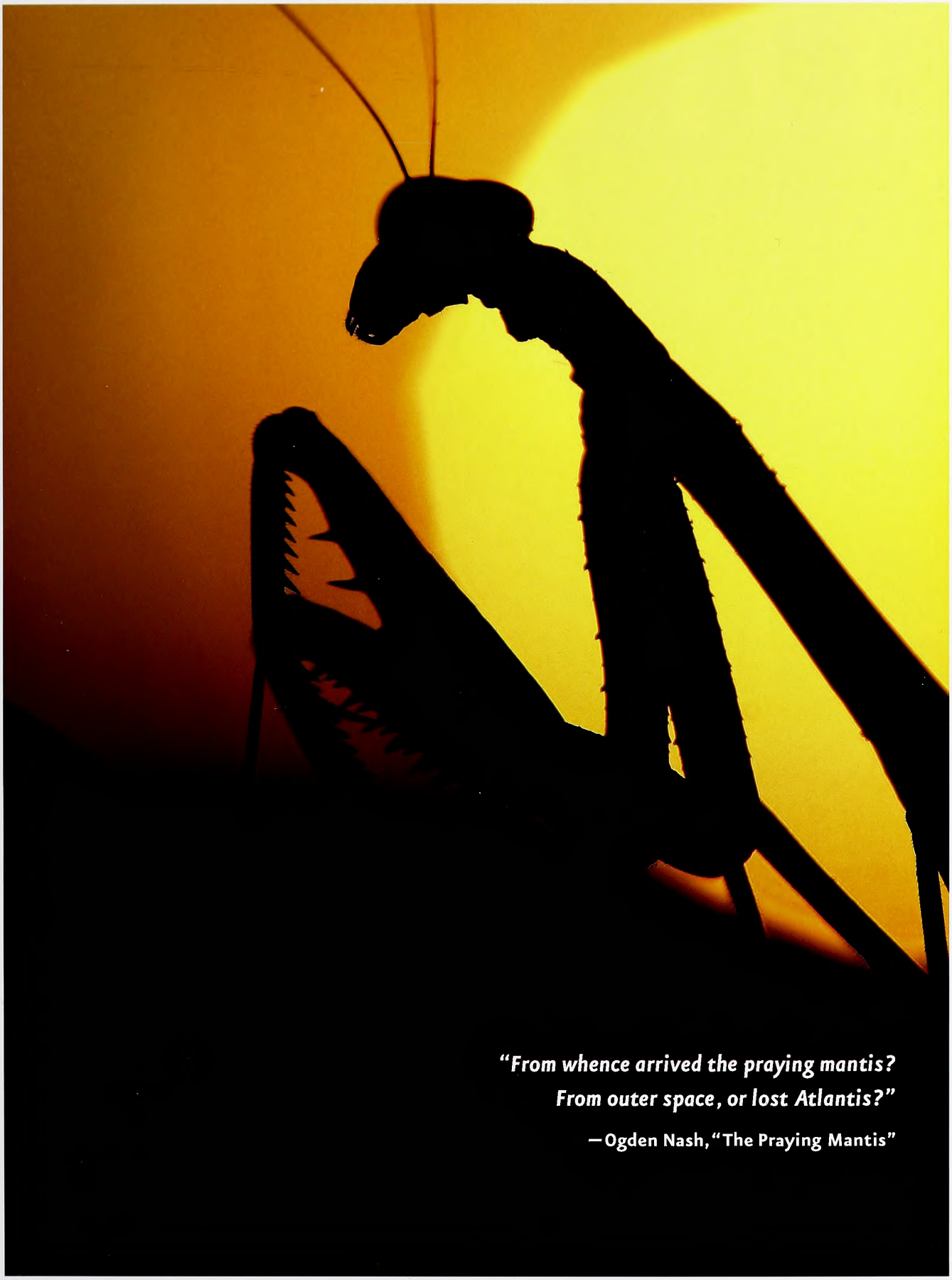
For a fly-fisherman, this river full of spawning stripers—locally called rockfish—is paradise, and no less so for the many fishermen who catch them using jigs, lures and bait.

Fly-fishing here, however, is a relatively new tactic. Typically, fishermen use a 9-foot, 9- or 10-weight rod with at least a 325- to 400-grain shooting head that sinks fast, and short 2- to 4-foot leaders. Clouser minnow streamers are favorites, and are usually tied on No. 2 to 1/0 hooks, though larger flies sometimes work well. Stripers favor certain color combinations at times (particularly those you don't have), and their effectiveness seems to vary from year to year. Some favorite combinations are Tutti-Frutti (pink and chartreuse) and white combined with chartreuse, gray, olive, orange or red. David has had great success with smallish black and orange Woolly Buggers. Many fishermen also use two flies spaced about 15 to 18 inches apart.

Ironically, fly-fishing would have been impossible in the Roanoke when I was a child because the river ran thick with pulp mill waste, poorly treated sewage and silt. The construction of upstream lakes in the 1950s reduced the silt, and an aggressive campaign to clean up the river set the stage for N.C. Wildlife Resources Commission biologists to apply modern management techniques to enhance the fabled runs.

It has been a remarkable success story. Certainly, there are other good East Coast striper runs, notably in the Dan River above Kerr Lake, and in tributaries to Chesapeake Bay and the Hudson River.

But those rapids at Weldon have historically hosted the most famous of them all. It's enough to give any fisherman reason to pause and give thanks.

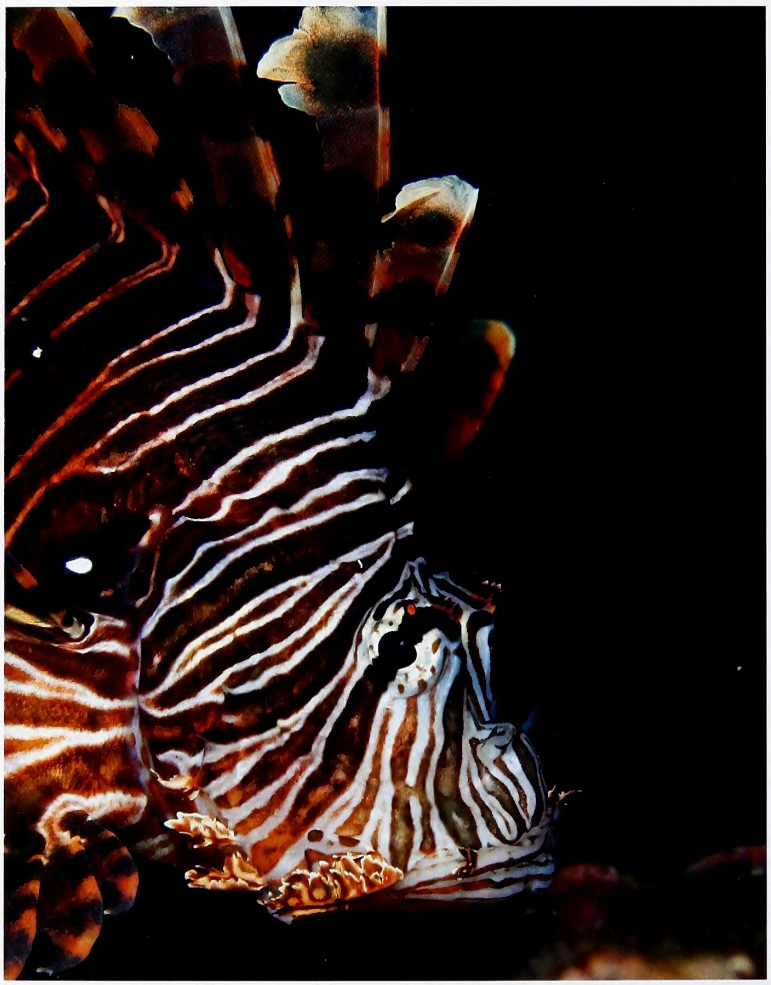


TODD PUSSER

Carolina mantis

OUTDOOR MOMENT

IN THE JUNE ISSUE



KAREN W. DOODY

NEW KING OF THE REEF

Native to Indo-Pacific waters, the invasive lionfish has made itself at home off North Carolina's shore.

EVERYONE'S GRANDFATHER

As Grandfather Mountain becomes property of the state, a former caretaker reminisces about its past.

NIGHT BITE

Use these techniques to fish small ponds by moonlight for a new kind of bass-fishing fun.

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WILDLIFE IN NORTH CAROLINA

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A non-native red lionfish cruises a North Carolina reef, surrounded by a school of tomtates, a common reef fish.

PHOTOGRAPH BY KAREN W. DOODY.

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Cover: Grandfather Mountain is home to a vast array of wildlife such as this juvenile peregrine falcon. PHOTOGRAPH BY RAY BARLOW.

Wildlife in North Carolina is the official educational publication of the North Carolina Wildlife Resources Commission. It is dedicated to the sound conservation of North Carolina's wildlife and other interrelated natural resources and also to the environment we share with them.

EDITOR'S NOTE

Jim Wilson has a way with words. This month, our associate editor directs his considerable skills to a subject that is as hotly debated as any political issue—Brunswick stew. Jim, who is a zealous researcher as well as a fine writer, details the culinary and cultural history of the venerable dish in "Southern Perfection" (page 8). He reveals that the original Brunswick stew was first cooked up for a hunting party some 200 years ago and owed all of its protein content to that delicious but labor-intensive game meat, squirrel.

MELISSA McGAW/NCWRC

When the spoon can stand up in the pot, Brunswick stew is ready to eat.

Jim claims to be of middling talent in the kitchen, but he makes a mean stew. And he makes it in the Virginia style, which means an orange mixture made with chicken, potatoes, onions, tomatoes, corn, butterbeans and little else. He offers tips for first-time stewmakers—easy on the heat, good ingredients make good stew—and argues that Brunswick stew deserves better than its second-fiddle status as a side dish to pork barbecue.

Just as importantly, Jim tells us how stew, with its timeless balance of flavors, can transport us back to our Southern childhood, where we ate it outside in paper bowls on gingham tablecloths at the volunteer fire station or Baptist church. It is an important part of our heritage, both as North Carolinians and hunters. The squirrel meat might be gone from most Brunswick stews, but it exists somehow in its DNA.

In another tip of the hat to Southern tradition, Jack Morton contributes his firsthand account of how his family gave much of their property on Grandfather Mountain to form a state park ("A Towering Legacy," page 20). Many of us of a certain age visited the mountaintop attraction with our families when we were kids, and those memories are honored in Jack's article. The Mile High Swinging Bridge and the other sights will remain in place and be accessible for a fair admission price, but almost all of Grandfather's "backcountry" is now yours to explore for free.

What could be better on a late spring day than to ramble around Grandfather Mountain? Maybe if you could return home that evening to a piping-hot bowl of Brunswick stew. These traditions are there for you to enjoy. Don't miss out.

Greg Jenkins

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JUNE 2010 VOLUME 74, NUMBER 6

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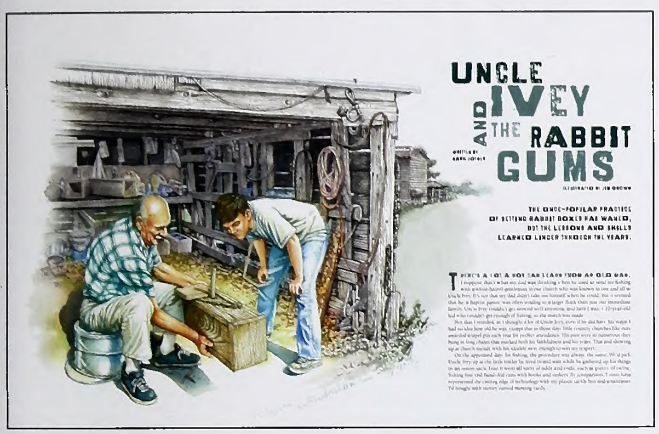


A Favorite Uncle

"Uncle Ivey and the Rabbit Gums" (March 2010) was a lovely story superbly written and illustrated. The boxes, gums and instructions were exactly what my brother and I used in the early 1950s with our 22 boxes. Before daylight we checked our boxes on our trusty steed, a Shetland pony, then had breakfast and got ready for school. A neighbor, Joe Benton, was amazed that the pony let us remount after we killed the rabbit with a quick chop at the base of its head. The pony probably took its cue from what I did to the rabbit. Thanks for a "Nostalgiaville" story.

William A. Ethridge
Newton

Thank you for the trip down memory lane in the article by Mark Joyner, "Uncle Ivey and the Rabbit Gums." It brings back fond memories of a son and father sharing a time together that will last a lifetime. This is the same joy that I have shared with my children and grandchildren.

As a young child I had the privilege to experience the thrill of setting and checking the rabbit gums with my father. This added much-needed meat for the table for a family of six during the late 1950s.

Every aspect of the article holds true to the building and placement of the rabbit gums, as my father showed me that the boxes had to be built from old lumber or a hollowed log.

Virran Crump
Albemarle

I want to say how much I enjoyed the March 2010 cover of the bluefish. The cover is reminiscent of covers of years ago when art was used instead of photos. I personally enjoy the work of artists better.

I also particularly enjoyed the article by Mark Joyner and artwork by Jim Brown. The article brought back memories of my grandpa teaching me the art of box trapping. I had 10 to 12 box traps that I set out each fall and checked regularly. Once in awhile my grandpa would have one for dinner, but mostly I just caught them for fun and released them unharmed. I hope to see more art covers and illustrations in the future.

Mike Calhoun
High Point

Spring Finery

In the March 2010 issue, I loved the photos of loons in breeding plumage with their chicks riding on their backs ("The Loon's Other Life"). The common loons we see wintering in North Carolina are almost always in drab winter plumage, but there are exceptions. At Jordan Lake, on a spring bird count held annually during the first weekend in May, I have twice heard a loon calling, and I've twice seen at least one in breeding plumage. And, yes, it was a thrill!

Ginger Travis
Hillsborough

A Beetle in the Battle

Thanks for your article on the threat of imported woolly adelgids to our native firs and hemlocks ("A Wild and Woolly Battle," March 2010). I would like to note several research-based factual additions to your coverage of the hemlock woolly adelgid (HWA).

First, we now know from DNA research that our HWA import came from Japan. Second, we also know that its hemlock host in Japan (*Tsuga seiboldii*) does not have a high level of natural HWA resistance. So the "peaceful coexistence" of hemlocks and HWA in Japan is more likely due to biological control than to genetic resistance.

Finally, we know that *Sasajiscymnus tsugae* is the predator beetle that protects Japanese hemlocks from this adelgid. This predator has been USDA-approved for U.S. release, and is demonstrating effectiveness in promoting hemlock survival and recovery. These effects can be observed in the Brevard area, where "Sasi" beetle releases by private landowners, municipal groups and the U.S. Forest Service are restoring foliage health to many Eastern and Carolina hemlock areas. More detailed information and links to relevant research documents are available at the noncommercial website www.savinghemlocks.org.

Patrick Horan
Sapphire

Thank You For Your Support

Often, when I read the letters section in your magazine, I am perplexed. I find many of the comments from readers to be unfairly critical. The pictures are beautiful; the articles interesting and well-written, regardless if the subject is hunting, fishing, educational, humorous or a delightful combination; the reports on legislative and regulatory activities informative. Even the section for children catches my interest. Please keep up your excellent work. Wildlife is an eclectic issue.

J. E. (Jeb) Britton III
Virginia Beach, Va.

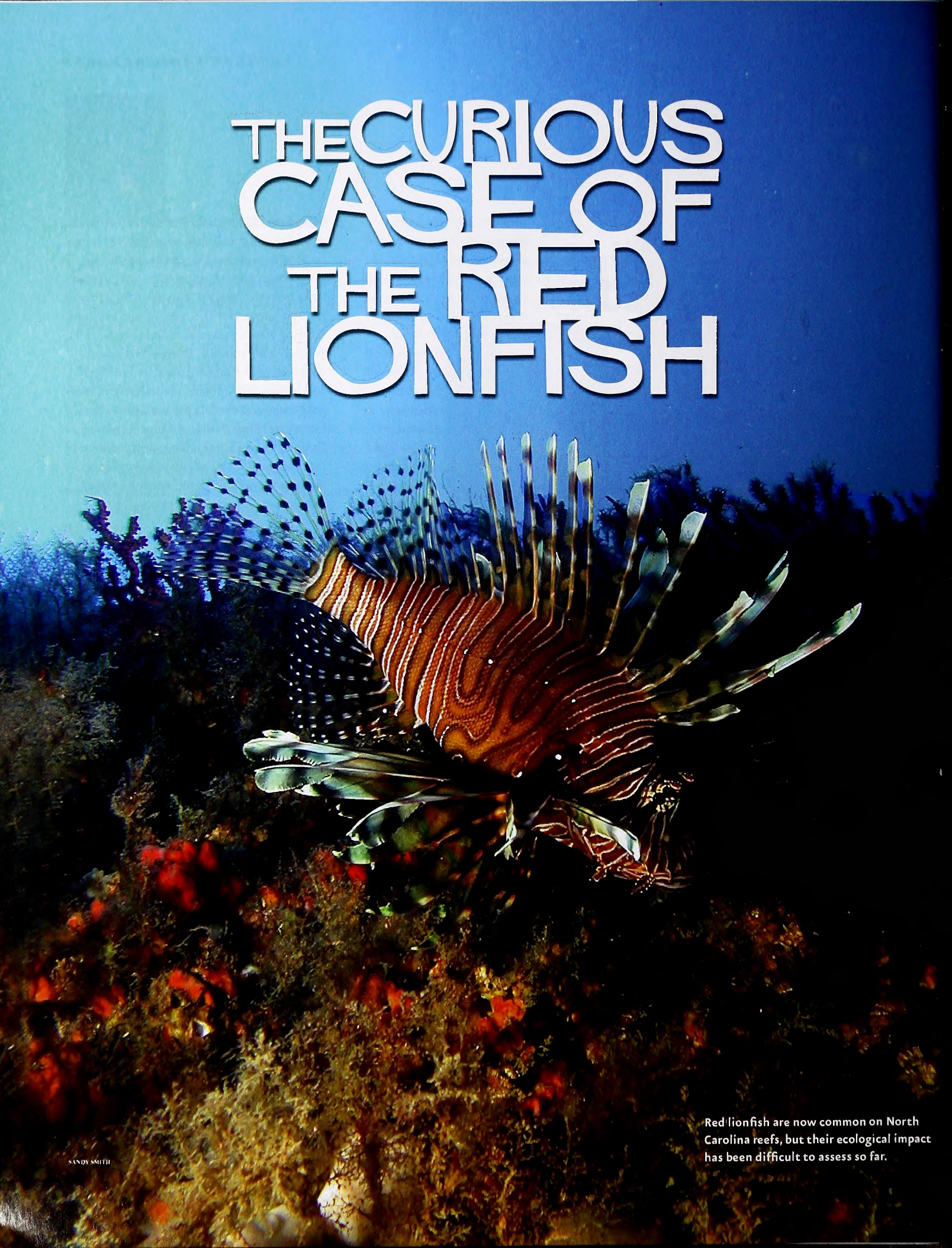
Clarification

The May 2010 Back Porch article titled "Beasley Center Sues to Stop Gill-netting" was published as a news story only and not as an endorsement of the lawsuit filed by the Karen Beasley Sea Turtle Rescue and Rehabilitation Center against the N.C. Division of Marine Fisheries (DMF). We failed to solicit comments from DMF or its director, Louis Daniel. However, we understand that DMF and its staff are prohibited from commenting on the lawsuit. We regret any misinterpretation of intent in the publication of this news article.

write us

Letters should be sent via e-mail to **letters@ncwildlife.org** *or through regular mail to Letters,* Wildlife in North Carolina *magazine, 1712 Mail Service Center, Raleigh, NC 27699-1712. Please include your name, address and daytime phone number. Letters chosen for publication may be edited for clarity and length.*

THE CURIOUS CASE OF THE RED LIONFISH



SANDY SMITH

Red lionfish are now common on North Carolina reefs, but their ecological impact has been difficult to assess so far.

SANDY SMITH

SANDY SMITH

KAREN W. DOODY

Beautiful, invasive and voracious, Indo-Pacific lionfish have become established in North Carolina waters and are wreaking untold havoc on offshore reefs.

WRITTEN BY MARK JOYNER

No one who lived in Florida in 1992 will ever forget Hurricane Andrew, one of the most powerful storms ever to make landfall on United States shores. Until Katrina, Andrew was the costliest hurricane in our country's history. Little noticed amid all the damage and confusion was an incident that led to the first case of a Pacific marine fish becoming established in Atlantic waters.

It's believed that the storm surge shattered a saltwater aquarium on the porch of a beachside home at Biscayne Bay, a tank that held six red lionfish. The exotic Indo-Pacific species has long been popular in the home aquarist trade for its zebralike markings and feathery fins. The escapees were seen over the next few days in the surrounding waters, where they apparently made themselves right at home. Within a year there were sightings all along Florida's east coast, followed by reports from the Georgia and Carolina coasts, and then as far north as Long Island, N.Y. The Atlantic invasion had begun.

In their native habitats on the far side of the planet, lionfish make their homes among coral reefs and rocky ledges, preying voraciously on practically any marine life that can fit into their cavernous mouths. Small fish are a particular favorite, sucked down in a lightning-fast gulp after being herded into a corner by the lionfish's elongated pectoral fins. Even though they seldom exceed 15 inches long, lionfish are a top predator in their home range.

That reputation is reinforced by the fact that very few if any larger fish care to tangle with them, thanks to a most effective system of self-defense. Embedded among the membranous fins are over a dozen razor-sharp, hollow spines that inject highly toxic venom at the slightest touch. The venom is produced and stored in pressure-sensitive glands at the base of the spines down the fish's back and along its sides. Fishermen and others in the region rightly fear the painful wound and are mindful that even a dead specimen can still deliver its poison.

Though it causes excruciating pain, the wound is seldom if ever lethal to humans. The venom is a protein-based neurotoxin that can typically be broken down by immersing the wounded area in hot water (110–113 degrees Fahrenheit) for at least 30 to 40 minutes, much like the treatment of stingray wounds. Fortunately, it's not nearly as potent as the venom of some other members of the scorpion fish family, to which it belongs. Its relative, the reef stonefish, is considered the deadliest fish in the sea, and victims are reported to have died within hours.

Expanding exponentially

Set free in its new environment, the lionfish displayed another of its unique characteristics, a reproductive style ideally suited for wide dispersal. Following an elaborate courtship ritual, a female may lay anywhere from 2,000 to 15,000 eggs that are externally fertilized by a male. The eggs and larvae are free-floating in oceanic currents and can easily be carried hundreds of miles. With the Gulf Stream current surging northward from Florida, lionfish were given a free ride to North Carolina waters, where they were first noticed by recreational divers in 2000.

That's when Darryl and Trish Boyer, on a dive charter aboard the *Atlantis IV* out of Atlantic Beach, noticed a strange fish lurking around the shipwreck *Naeco* some 30 miles off Cape Lookout in 130 feet of water. Capt. Bobby Edwards was familiar with most of the marine life found on the wreck of the tanker sunk by a German U-boat in 1942, but the description was new to him. He loaned the Boyers a camera to take down on a second dive to try to get a photograph. They succeeded, and the photos were taken to the N.C. Aquarium at Pine Knoll Shores, where staff member Bob Jones provided positive identification of the fish as *Pterois volitans*, otherwise known as the red lionfish.

Despite a few news stories at the time, few people realized the significance of finding a fish where it shouldn't be. Two years later, the submersible *Johnson Sea-Link II* stumbled upon more specimens off Cape Fear at a depth of 240 feet. The researchers, led by Steve Ross with the N.C. Coastal Reserve, were stunned to find the fish at such an extreme depth, since they're not known to venture so deep in their native setting.

Even with the confirmed sightings, it was unclear whether these were wayward specimens or whether a population had been established. That was answered in 2004 by marine biologists Paula Whitfield and James Morris with the National Oceanic and Atmospheric Administration (NOAA) lab in Beaufort. Examination of captured specimens revealed the "ripeness" of their reproductive organs, meaning the newcomers had likely gained an ecological foothold.

Their conclusion seems borne out by the astonishing rate at which the lionfish population is now increasing. "At collecting sites where a few years ago we were surprised to actually find a lionfish, we're now seeing dozens, and hearing reports of hundreds on some wrecks," says Hap Fatzinger, husbandry curator at the N.C. Aquarium at Fort Fisher. "Most of these sites are as far as 30 miles offshore at depths of 100 feet or more, which probably explains why there haven't been many encounters yet with fishermen."

Further research by NOAA's Whitfield and her associates indicates another alarming trend: The lionfish are growing much faster here than in their native range. Among the reasons may be the lack of predators, as even sharks shy away from such a spiny meal. There may also be more available food, including unwary fish that haven't learned to avoid these stealthy feeders.

The biggest toll seems to be in the young of other fish species. As much as 97 percent of the lionfish diet is composed of small fish. One hungry specimen was observed consuming 20 small fish in 30 minutes. The impact has been nothing short of catastrophic as they eliminate entire communities of marine life, an effect likened to the spread of kudzu or a plague of locusts. For already stressed species such as snapper and grouper, the consequences may well be irreversible.

If there's any check to the invasion, it may be that lionfish are sensitive to cold. NOAA research indicates that lionfish can't survive at temperatures below 50 degrees F., and our inshore waters typically drop below that in winter. For the time being, they're limited to offshore depths of at least 100 feet, where the year-round temperatures meet their needs. That would place the northern limit of their survival range around Cape Hatteras.

Here to stay—so eat up

There's some hope that a fishery could be developed, since lionfish are a delicacy in certain places. "The toxin in no way taints the meat," says Steve Broadhurst, dive master with the N.C. Aquariums. "Fishermen will of course have to first learn to deal with the danger of being stung, but the spines can easily be snipped off with wire cutters. After that, the fish can be cleaned and used in any number of recipes."

Some dive companies are teaming up with the scientific community to monitor lionfish populations and bring attention to the threat. Debbie Boyce, owner of Discovery Diving Company in Beaufort, has taken the lead in organizing events known as Lionfish Roundups, in which volunteer divers collect hundreds of specimens in a single day. Boyce is working with the Carteret County Culinary Institute and Sea Grant to promote uses for the fish's flavorful meat and persuade restaurants in the area to add it to their menus.

A further glimmer of hope may be in the deployment of traps that can selectively target lionfish. NOAA's Morris is experimenting with a wire mesh trap roughly 5 square feet in size that features a clear tube in the middle baited with live fish. It takes advantage of the lionfish's fondness for live food, the same preference that limits their take by traditional hook-and-line fishermen.

Barring some unforeseen development such as a parasite or other natural control to limit their spread, lionfish are here to stay and have become a fact of life. However dire the outlook may be for North Carolina waters, it's many times worse in the Caribbean and the Bahamas, where the cold-water limitations don't apply. Those regions are now facing the devastation of entire reefs and possibly much of their tourism economy.

To the growing list of our state's invasive plant and animal species such as fire ants, hydrilla and beach vitex can now officially be added *Pterois volitans*, as the curious case of the red lionfish continues to play out. ◆

Mark Joyner is the executive vice president of the N.C. Aquarium Society and a regular contributor to Wildlife in North Carolina.

PHOTOGRAPHS BY KAREN W. DOODY

Scuba divers are taking matters into their own neoprene-covered hands, participating in "lionfish roundups" to remove the invasive fish from reefs. The specimens are often donated to researchers and occasionally find their way onto dinner tables.

SOUTHERN Perfection

The ways of cooking, like the ways of women, are mysteries to most men. Some of us do manage to master the kitchen, although I do not consider myself among that number. I feel comfortable there, possessing middling skills that allow me to cook what I like. My desires, however, are few, running to traditional Southern foods and wild game, with a few Italian dishes tossed in. If called upon I can cook other things, but without enthusiasm.

As for the ways of women, I suspect all men tend to be shell-shocked wanderers, staggering through a foggy no-man's-land searching for signposts, unsure of what they did wrong or what they did right and wondering why what was right once is now wrong. I used to think I understood women a little but gradually realized I was mistaken. (Actually, I was told I was hopelessly ignorant.) And after a particularly harrowing episode in a big-box home improvement store, I have come to believe that women's ways are as alien and recondite as those of monks who bathe every seventh Tuesday and spend their lives guarding a most holy relic, the significance of which has been lost for a millennium.

Simple yet time-consuming, Brunswick stew provides a hearty meal and summons up good memories.

Written by Jim Wilson

Photographed by Melissa McGaw

"Vegetables are not in the original Brunswick stew. Those who prefer vegetables add them after the stew is done, in their plates."

Time has a way of scrubbing away those notions we held with much certainty, sometimes leaving a man surer of what he does not know than what he does. I do know—and will not be shaken from the belief—that Brunswick stew, that Southern favorite, is one of the finest concoctions ever to grace a table. I suppose no brother has ever turned against brother, no marriage been rent asunder, no friendship fractured in disputes over the proper recipe for Brunswick stew. I don't understand why not, but having never heard of such, I'm guessing that's the case.

Brunswick stew is a dish that appeals to men who like to cook, what with the preparing of huge portions of meat, perhaps some of it killed by the cook himself, and the fact that the dish is best cooked outdoors, preferably with a few cronies hanging around for moral support. Stew making also consumes significant quantities of time, much of which is spent just standing and looking while the stew simmers, interrupted by the occasional stirring of a large pot with a long wooden paddle. Most guys are good at working 10 minutes out of 60. "No, Honey, I can't go to the store and get you some eggs; I got to keep an eye on this stew. But when you go would you bring me another beer?... Hey, have I told you today I love you?"

Brunswick stew has long been a staple of the South, its flavors and traditions having been guarded and nourished at volunteer fire department and church fundraisers for generations. If the Methodists needed new choir robes, it was time to make a stew. I guess it was a simpler time than most of us realize, one in which a stew had the power to draw people together. As our state becomes increasingly urban, many of us get our stew these days in barbecue restaurants. That's a fine setting, but it pales in comparison to the delights of the outdoor eating of stew.

In my childhood in Granville County, I assumed that Brunswick stew, like sliced white bread and Baptist Training Union, was universal. That's not true, even in North Carolina, where Brunswick stew all but disappears from the menus of barbecue restaurants in the western sections of the state, becoming scarcer than a liberal Democrat at a gun show. (Barbecue itself vanishes in parts of the country—and that's most parts—where heavy tomato sauce instead of a vinegar-and-pepper sauce accompanies any barbecued meat. Is it really necessary to say that barbecue can be only pork? You can barbecue beef, but it ain't barbecue.)

Although Brunswick stew and barbecue are a delectable combination, over the decades stew

has been relegated to the role of barbecue's sidekick, sort of an Ed McMahon to barbecue's Johnny Carson. It deserves better.

Virginia and Georgia stew enthusiasts have carried on a good-natured, long-running feud as to which state could claim to be the home of this noble meat stew. (There is a lukewarm claim that the stew originated in North Carolina's Brunswick County, but few take that one seriously.) I don't have a dog in this fight, but the Virginia recipe, simpler than the Georgia version and much older, is more to my liking. Beyond that, I only know that I like my stew cooked in the manner of that I ate as a child. Growing up hard by the Virginia border, that was the Virginia-type stew.

The original Virginia stew—according to legend cooked by Uncle Jimmy Matthews for an early-19th-century hunting party of Dr. Creed Haskins or, depending on the telling, a political rally—contained only squirrels, stale bread, onions, butter and seasonings.

At first, the hunters were skeptical of Uncle Jimmy's gray stew, looking as it must have like lumpy, day-old dishwater. But hungry hunters—or politicians—tend not to be picky, and they loved the flavor of the stew and took the recipe home. Almost immediately, it seems, cooks began tinkering with the ingredients, primarily by adding vegetables, then by eliminating the main ingredient, squirrel, in favor of meat that required less effort to obtain.

The alterations to the original Brunswick stew were noted by Meade Haskins, a descendant of Creed Haskins, when in 1907 he stated: "Vegetables are not in the original Brunswick stew. Those who prefer vegetables add them after the stew is done, in their plates." Thus, today's Brunswick stew bears little resemblance to the original.

According to the strictures of the Virginia Brunswick Stewmasters Association, the only acceptable ingredients for a Brunswick stew are chicken, fatback, tomatoes, butterbeans, onions, potatoes, corn, butter, salt, black pepper, red pepper, sugar and one additional thickening ingredient. A "special" stew has beef and chicken, while a "deluxe" stew contains chicken and squirrel.

Any of those three options will result in very good stew. Although chicken has become the standard, no Brunswick stew is better than one that contains expired tree rodents. However, most people don't have 70-odd squirrels in the freezer to throw in a big pot out in the yard, which remains the best place to cook a stew and the only way to cook enough stew to place in quart containers and half fill the freezer.

Most of us cook our stews indoors these days, either because we don't have large stewpots or don't want the effort and expense of making a 10- or 20-gallon stew. Even with a stovetop stew, plan on a considerable investment of time. Making Brunswick stew is simple but not quick.

For a 12-quart stovetop stew, I use chicken thighs, several large packs of them, about 12 to 15 pounds or so total. You can't have too much meat. The butterbeans and white corn are frozen, several bags of each. I usually peel and cut potatoes into small chunks until the pile looks right. It usually works out to about 8 or 10 pounds. I prefer round white potatoes over yellow potatoes, but I'm not sure I have a valid reason for that preference. Onions? Three or four large ones or until I get tired of chopping. I like the onions in small pieces because I want them to disappear in the stew. I don't want a slippery piece of cooked onion the size of Delaware in my mouth when I shovel in a spoonful of stew. The tomatoes, three or four large cans, are a combination of diced and crushed; this saves having to chop whole tomatoes.

Boil the chicken the night before until it is almost off the bone. Put the whole pot in the refrigerator overnight, and then pick the meat from the bones the next morning. It should just about fall off. Discard the skins and bones and use the water that you boiled the chicken in as the base of the stew. This broth will have some fat from the skin and meat, so the Stewmasters' fatback is perhaps unnecessary, although in a nod to tradition and taste I like to include it too.

The chicken, potatoes, onions, fatback and butter, two or three sticks, go into the pot first, along with the seasonings, which you will need to tinker with during most of the cooking. It's best to remove the fatback when it begins to come apart. I'm not sure sugar is really necessary, but folks say it cuts down on the acidity. I don't like sweet Brunswick stew (or, God help us, cornbread with sugar), so I use a tablespoon for 12 quarts, which is like not using any.

I like my stew just slightly orange, so I back off on the tomatoes. I would like to cook a stew once without them, just a gray stew as a tip of the stew paddle to Uncle Jimmy, but I'm not sure it would receive a warm reception.

The key to Brunswick stew is controlling heat. In the beginning, bring the

chicken, broth, onions and potatoes to a low boil and let them bump along for a short while. The more stew I cook, the more I believe it's best to allow it to cook for a couple of hours or more before adding first the butterbeans and finally the corn. When you do add the vegetables, it will take a bit for the stew to come to a simmer again, but resist the urge to help the process by cranking the heat to the highest setting. You want the concoction to bubble just a bit.

Brunswick Stew Ingredients

12-15 lbs. chicken thighs
8-10 lbs. white potatoes
4 large onions (white or yellow)
2 (24 ounce) bags frozen butterbeans (small)
2 (24 ounce) bags frozen white corn
1-2 (28 ounce) cans diced tomatoes
1-2 (28 ounce) cans crushed tomatoes
Kosher salt
Red pepper (crushed or dried pods)
Black pepper
2-3 sticks salted butter

High heat will scorch a stew quicker than you'd think possible. You'll be stirring a perfectly good stew one minute and the next turn up what looks like a long, dark skid mark from a Jeff Gordon victory burnout from the bottom of the pot. This also applies to reheating stew: avoid high heat. It is not your friend. To eliminate this problem, I've taken to adding the tomatoes, which can burn quickly, very late in the process.

Stirring goes hand in glove with controlling heat. It's more fun outside where you can use a long wooden paddle, but a wooden spoon works well in the house. The consistency of the stew should be such that the paddle or spoon will stand upright in the middle of the pot. Traditionally, that's the indication of when the stew is done.

A word on ingredients: Making a Brunswick stew can be a great way of cleaning out the freezer. Venison, quail and rabbits might not be on the Stewmasters' list but still make a very good stew. Do not, however, make the mistake of using meat you suspect might be too old or freezer-burned. The stew will not disguise the taste of meat past its prime. Instead, the meat will ruin the stew. Bad ingredients always will yield bad stew. You will be unhappy, very unhappy, at having fallen under the spell of false economy.

And Brunswick stew is a food that should make you happy, evoking as it does for some of us pleasant memories of a North Carolina childhood, of picnic tables covered in white paper, sweating steel urns of sweet tea and murmuring conversations punctuated by eruptions of laughter from plainly dressed men and women who not long before were sitting on tractors or ironing clothes. The lure of Brunswick stew and conversation brought them together, the men in khaki shirts and pants, the women mostly in worn cotton dresses.

I still remember the feel of the men's rough, tanned hands as they rubbed my buzz-cut head briskly and laughed, and the talcum powder and coconut pie smell of the ladies as they patrolled the tables, asking, "Do you need something else, Honey?" I was fortunate to have grown up in that little place, lucky to have benefited from the kindnesses of those people. They gave more than I returned. And though many of the adults I knew then are now dead, their faces and voices remain more vivid than those of most people I've met in more recent times. All that returns, borne by the taste and the smell of Uncle Jimmy Matthews' Brunswick stew. ◆

Jim Wilson is the associate editor of Wildlife in North Carolina. *Share your stew preferences with him at jim.wilson@ncwildlife.org.*

moonlight madness

Bass fishing ponds at night might seem wacky to some, but try it and you might become crazy about it yourself.

Written by Marty Shaffner
Illustrated by Joe Mahler

Some years ago a co-worker asked one afternoon as we were leaving work if I wanted to fish for largemouth bass at a local pond that night. When I acted surprised at fishing in the dark, he replied, "So you've never been at night? You're in for a treat. I throw big black Jitterbugs, and it's crazy!"

He had me at "Jitterbugs." Being a sucker for any type of topwater fishing, I was ready to go. It had been a sultry, late-July day with temperatures in the high 90s—the kind of day when you sweat just standing still. As I would learn, these were perfect conditions for night fishing.

A thunderstorm had just passed when my buddy came by to pick me up. Our destination was a pond notorious for not giving up its big bass. Nestled at the foot of the mountains, the pond was fed by springs and was surrounded by woods and grass, making the water very clear. Everyone who fished the pond saw big bass, including myself, but I knew of no one who had ever caught one.

Cloudy skies left by the thunderstorm had caused an early darkness to settle over the hollow where the pond was situated. An eerie fog was lifting off the water, and the woods were quiet except for the calling of frogs and the dripping of water from the surrounding trees. I could see the outline of the shallow end of the pond and the dark forms of scattered cattails that grew there. I made a long cast toward the cattails and tripped the bail. As I began to retrieve the black Jitterbug, the unmistakable sound of the metal blade walking back and forth made a plop, plop, plop sound that echoed across the water — until it was interrupted by the strike of a largemouth. I set the hook and soon landed a bass that weighed about a pound and a half. Not big, but one cast and one fish. *Not bad,* I thought.

I caught two more bass in five more casts. Then, about five minutes later, a loud strike stopped the Jitterbug, and when I set the hook, the bass pulled hard. After a short but intense battle, I landed the first of two bass in the 5-pound class that night. Another big fish broke off near the bank. I have been hooked on Jitterbugging bass ponds from that night forward.

Where and When

Almost everyone knows of a pond or two they can fish. If not, just look around while you're out driving. Ponds are everywhere in North Carolina. Farms, golf courses, housing developments, county watersheds and municipal parks all have ponds. Almost all ponds are underfished, and even if the pond does have heavy fishing pressure, odds are nobody fishes it at night. Many ponds are on private property, though, and permission from the landowner should be obtained before fishing. Even if you are refused access at one place, if you ask at several places, odds are someone will allow you access. Farm ponds are your best bet for obtaining permission to fish, but make sure to tell the owner you want to fish after dark. For ponds located on public land, be certain nighttime access is allowed.

Summertime is the season for topwater action at night, but bass will hit topwater any time the water is above 65 degrees. The hotter the better, it seems, because the fish respond to the cooling water at night and the safety of low-light conditions. All things being equal, the moon phase seems to make a difference too. Three days on either side of a full moon or new moon is best, and any time between the full and new moon is a good second.

Another tip is to check the Solunar Tables for peak feeding periods during the night. I have noticed that bass seem to follow these predicted feeding times more closely at night than during daylight hours. Prevailing conditions will make a difference as well, such as a thunderstorm just before or after dark. The fall in water temperature and the low barometric pressure will cause fish to feed aggressively. Use extreme caution when lightning is in the area.

Tackle and Lures

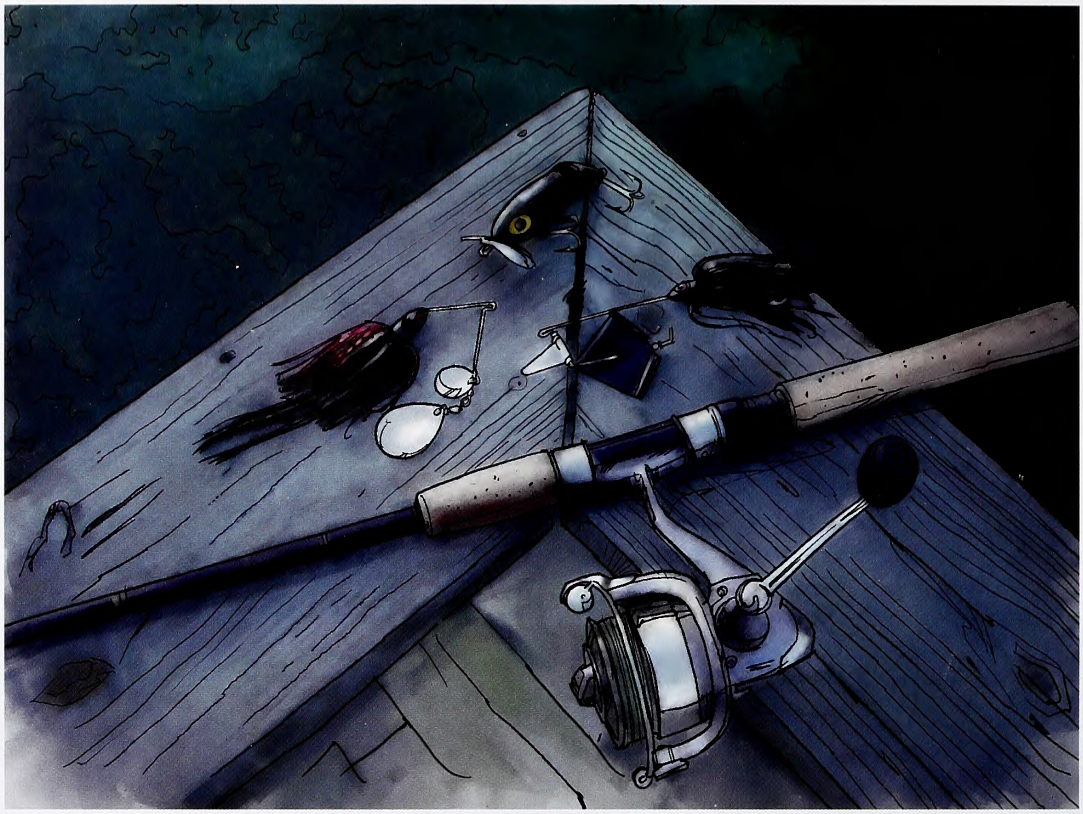
Tackle selection for night fishing needs to be simple. Remember you'll be fishing in the dark of night with only the light the moon provides, and during the new moon there will be no moonlight. First, you will need a good-quality headlamp, preferably one with both white and red lights. The red light option is invaluable for night fishing because it does not cause your pupils to contract as white light does. When your pupils have to readjust to the darkness, you lose your night vision for a short period each time you turn your headlamp on and off. With a red light you can use the lamp to take a quick look at your lure, unhook a fish or untangle a line and then turn off the light, and your eyes are still adjusted to the dark. Just remember to bring an extra set of batteries for your headlamp.

Reels for night fishing can be anything you are comfortable with. Use whatever you are able to cast and work with your eyes closed, because in essence that is what you will be doing. Spinning reels are fine, as are baitcasters or even a high-quality spincasting reel. If you decide to use a baitcasting reel, just remember you need to be very proficient at casting, as you don't want to pick out a backlash in the dark. Keeping the spool tension a little tighter than normal while night fishing will help reduce the number of backlashes and overruns. If you use a baitcaster, it would be good to keep a spare reel loaded with line in your tackle bag. That way if you backlash badly, you can just trade reels instead of trying to pick out a big backlash.

Don't laugh that I mentioned spincasting (closed-face) reels earlier. Remember, any small problem you have when fishing at night is magnified by the fact that you can't see. Spincasting reels are almost guaranteed not to tangle or backlash; just make sure you use a high-quality spincasting reel with a decent drag and enough line capacity to handle at least 14-pound test monofilament. I personally use spinning reels, because they are what I am most comfortable with.

Rods need to be capable of medium to medium-heavy action and of comfortably casting 3/8 ounce to 1 ounce of weight. I like a medium-heavy spinning rod with a strong, stiff butt and with a little bit of give in the tip. My personal favorite is a G. Loomis SJR783S in either Model GL3 or IMX. This is a one-piece, 6-foot 6-inch rod with medium-heavy action rated for lures from 3/16 to 5/8 ounce that will easily

I set the hook and soon landed a bass that weighed about a pound and a half. Not big, but one cast and one fish. Not bad, I thought.



Lures and tackle storage should be kept simple.

throw 3/4 ounce. The length helps with making longer casts, which can be important when fishing bigger ponds from the bank. A 7-foot rod would also work well, and if you already have a 6-foot rod, you can make it work. The main thing is to have a rod with a strong butt, so you can muscle big bass away from cover, and a softer tip that will allow a little give to ensure that the fish get the lures in their mouths before you set the hook.

Line can be either monofilament or braided. Mono should be at least 12-pound test, but I prefer 14-pound to 20-pound test, and braid from 30-pound to 50-pound. I use braided line, but if you're not accustomed to braid, the dark of night is not the time to try it out. Braided line has its own characteristics, which are very different from monofilament. You should fish with it for a while during the day before using it at night. Remember that line visibility is not an issue at night, and you need heavy line to stay in control of the situation when battling big bass. A largemouth will wrap your line around obstacles if you don't stay in control of the fight.

If you choose to use one of the braided lines, it's not a bad idea to carry a small 2-by-4-inch or 2-by-2-inch block of wood with you. It will come in handy in case you get hung up, as it will allow you to wrap the line around the block of wood and break it off. Braided line has a small diameter compared to mono and can cut you if you try to break it by hand.

Lures and tackle storage should be kept simple. A small plastic lure box such as a clear-sectioned Plano box is all that is necessary, but a small tackle bag that can be slung over your shoulder can be handy and keep all your gear organized. As for lure color, just like Henry Ford's Model T, any color will work as long as it's black. I know it seems to make no sense, but black is silhouetted against the night sky, making it the most visible color. If you could have only one lure, I would pick a 5/8-ounce black Jitterbug, the king of night fishing. It can be worked slower than a buzzbait but still has the steady cadence that helps bass to track it down in the dark.

Heddon's Crazy Crawler is also a nighttime killer. Similar in body shape to a Jitterbug, the Crazy Crawler has two metal wings on each side of the bait, causing it to run in an erratic back-and-forth pattern across the water. You might want to use a wire leader with the Jitterbugs or Crazy Crawlers

because the metal lips or wings can fray lines, causing you to break off fish. If you choose not to use a wire leader, check your line after each fish. If any fray exists, cut off the damaged section of line and retie your lure.

Other lures you might want to add to your arsenal include a few ⅜-ounce to ¾-ounce black spinnerbaits and buzzbaits. When fish don't want to strike on top, spinnerbaits can provide the vibration that helps fish track them down. Spinnerbaits should have a single large Colorado blade for maximum vibration. Most times I take only a few black Jitterbugs and three or four spinnerbaits. Add a pair of pliers for removing hooks, some nippers or scissors for cutting line, and either a waterproof camera or digital camera in a waterproof case to take pictures of your bass before releasing them, and you'll be ready to hit the pond.

Tactics and Techniques

Most bass ponds are fairly small and can be fished productively without a boat, although on larger ponds or small lakes a johnboat can be used. Feeding bass are more prone to be in the shallow sections or cruising the edges of the deeper parts at night. Frogs, tadpoles, crayfish, small panfish and minnows abound in the shallows.

The fact that bass are likely to be in shallow water makes fishing the pond effectively from the bank easy. I like to start at the shallow end and make casts in a fan-shaped pattern, starting right next to the bank and working out to the center, covering as much of the shallow end as possible. After doing this two or three times, I'll walk 40 to 60 feet down and do the same, except in the deeper parts of the pond, where I fish from the bank out only about 20 or 30 feet. I'll work all around the pond until I end up on the opposite side of the shallow end. This will allow you to work the most productive parts of the pond thoroughly. If you don't get any hits on the topwater lure by this time, switch to a spinnerbait and rework the pond.

My time on the water has shown that the first time you fish a pond at night, if conditions are good, you will get your best results. I've had some great results on my first trip to a pond, sometimes catching large numbers of bass along with several other large fish, but fish get conditioned to fishing pressure pretty quickly. If you night-fish a pond several times, your success ratio will drop. You will still catch fish, just maybe not in the numbers you did on previous trips. Remember, it takes only one lunker to make the trip a success.

If you do catch a big one that first time out, the moonlight madness bug may bite, and you could become addicted to night fishing. Your neighbors will start talking about how crazy you are to go out fishing all night in the dark, and you'll start showing up at work sleepy, with bloodshot eyes, which won't make you the employee of the month. Your boss will wonder what caused the downward spiral of your promising career. Your wife may even accuse you of doing things you're not supposed to when you're out late at night, another good reason to remember to take the camera with you. At least you will have pictures of the bass you catch to prove you did go fishing. ◆

Marty Shaffner is an Elkin fishing guide with Tri-State Angler Service and a regular contributor to Wildlife in North Carolina.

time for dinner

When I went fishing to research this article, I had a pretty good evening. We started at about 8 p.m. and had steady action that climaxed when I landed a 26-inch largemouth bass that weighed 9 pounds, 12 ounces on a black Jitterbug around 9:15. Not long after I landed the big bass, the bite died, so we called it a night a little after 10.

After returning home I began to wonder when the predicted feeding periods were for the day. I checked the Solunar Tables and found that the major feeding period was predicted to be from 7:59 p.m. until 9:59 p.m. Not too bad a prediction!

A TOWERING *Legacy*

The formation of Grandfather Mountain State Park brings *a new day* for North Carolina and the Morton family.

WRITTEN BY JACK MORTON | PHOTOGRAPHED BY HUGH MORTON

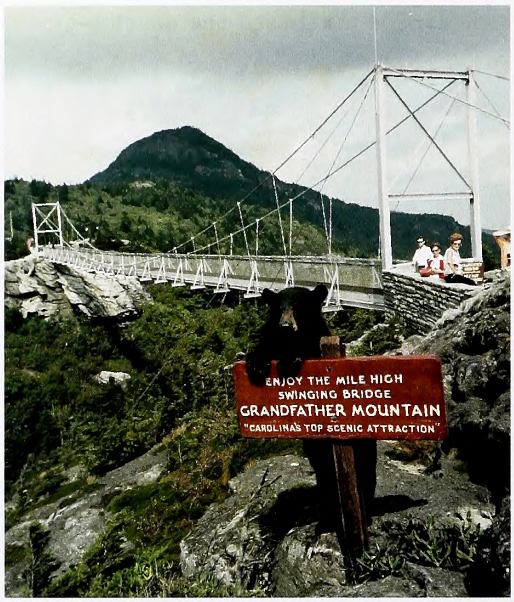
Grandfather Mountain was always my back yard, and I realize now how lucky I was to have unlimited access to such a glorious playground. Hugh Morton, who died in 2006, was my grandfather; his great-grandfather Donald MacRae purchased the development rights for the 16,000 acres comprising Grandfather Mountain in 1885 from the wealthy and reputable William Lenoir, and my granddad inherited the property from his grandfather (my great-great-grandfather) Hugh MacRae in the early 1950s. In 1952 he opened the towering novelty as a tourist attraction, having constructed a driving road to the top, along with the iconic Mile High Swinging Bridge, a 228-foot-long journey across an intimidating chasm atop the mountain. He had a vision.

My granddad raised his hand when his grandfather's will was being put into play, visualizing the opportunity to do something unique with a property that none of his siblings desired, most likely due to the intimidation of managing and maintaining such an enormous and rugged piece of property. Knowing the property as I do, I'm certain that my granddad realized it could be developed in a number of ways. Having already seen the lure that accompanies a mesmerizing mountain golf course (Linville Country Club boasts a Donald Ross-designed course built in the early 1900s), he knew that the possibilities for resort development were likely prominent.

But the early 1950s were a time for family car trips, loading the kids in the Chevrolet and crisscrossing the country to witness the novel, unusual and spectacular. Little boys wore coonskin Daniel Boone hats and played out their Davy Crockett fantasies in front yards everywhere; Route 66 and roadside inns were the standard. And the views from atop Grandfather were indeed spectacular.

Visitors for generations have flocked to Grandfather Mountain. Among its attractions are Price Lake (opposite page), native plants (top) such as these blueberries, and wildlife. Mildred the bear (bottom) arrived at Grandfather in 1968 and was a familiar sight for years.

Among the many sights at the mountain (counterclockwise from below left) are the famous mile-high bridge and plants of many varieties. Hang gliding also was a popular pursuit at Grandfather for a number of years.



In 1968 my granddad purchased two black bears to release into the wild on Grandfather. To his great fortune, the female refused to leave, simply too comfortable with the idea of living under the caring hand of humans. By 1973 her habitat was constructed, and Mildred the Bear became, by default, an iconic mascot for Grandfather Mountain for years to come. Yes, the late '60s and early '70s were a different time, and I have to chuckle thinking about the photos I've seen of my late father, Hugh Morton Jr., orchestrating the "Bear Show," a carnivalesque demonstration that ended with Mildred being rewarded with a can of Pepsi. Fueling a black bear with soda would probably not draw rave reviews in 2010, but it was all a part of the entertainment that accompanied the breathtaking views at Grandfather Mountain, and people came by the carload.

Over the subsequent decades, the business of Grandfather Mountain was tweaked and adjusted many times. In the 1970s hang gliding was hip, and many brave souls launched themselves into the sky from the ramp installed on the far side of the Swinging Bridge. Various animals gained habitats, new neighbors for Mildred such as eagles, deer, cougars and, most recently, otters. Under my dad's supervision the Nature Museum was constructed and opened nearly 20 years ago, providing a movie theater, educational exhibits, a gift shop and a restaurant.

The new Top Shop, an aerodynamic and "green" replacement for the original visitors' building atop the property, is almost complete. Hiking trails abound, running to and fro like fudge down the top of an ice-cream scoop. And speaking of fudge, there is now a stand-alone building near the Nature Museum for sweet-toothed visitors to buy just that. In 58 years much has changed, but the rugged, beautiful blanket upon which the business was laid has not.

Now we, the Morton family, face the greatest change we have seen during our 125 years of property ownership in Avery County. It is a voluntary change, something we felt a calling to pursue, but that doesn't make it a seamless one. It was announced in September 2008 that the state of North Carolina would purchase nearly 2,500 acres —most of the property—and manage it as the 34th state park.

At the time of this writing, the lengthy process of transferring ownership was well under way. The number of contracts for legal

Grandfather Mountain TIMELINE

Grandfather Mountain opened tourist attraction, mile-high swinging bridge.

1885

Donald McRae purchased 16,000 acres comprising Grandfather Mountain.

1924

Linville Country Club course designed by renowned golf course designer Donald Ross.

1952

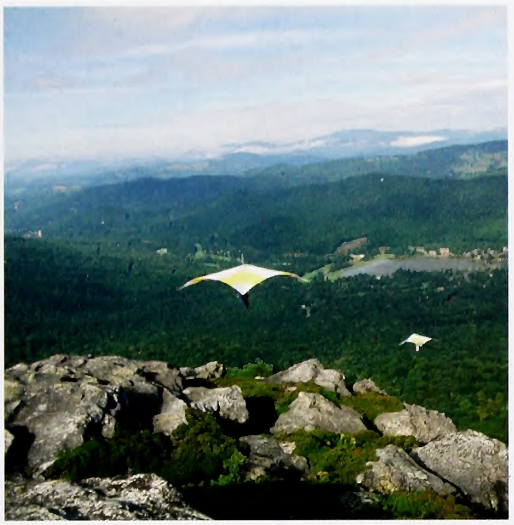
review, angles for consideration and tiny rocks that must be overturned is beyond comprehension. As a member of the board of directors, I walk away from each of our meetings in awe of the number of specifics that must be addressed at the front end of this transaction. Because media coverage of the sale is somewhat void of details (as it should be), friends and fans often ask the simple questions sometimes overlooked and very difficult to answer. One is asked more than any other: *Would this have happened under Hugh Morton's guidance?*

That is impossible to answer with any accuracy. My granddad was a member of what Tom Brokaw termed the Greatest Generation. No, he didn't grow up without food on the table, and yes, he inherited a sizable piece of property, but he worked hard to develop his vision, and strove relentlessly to use the property and the value it possessed for the greater good. He worked tirelessly on clean-air legislation, fighting smokestacks, and even orchestrated a program hosted by the late Walter Cronkite on acid rain. Alongside my dad in the late 1980s, he donated parcel upon parcel of the mountain's acreage to The Nature Conservancy, ensuring that the lands surrounding the actual business property would remain pure and undeveloped. And we all know the legend resulting from how hard he fought the construction of Blue Ridge Parkway pavement across the property, resulting in a Linn Cove Viaduct so grand that it's been featured on the History Channel's "Modern Marvels" as an engineering wonder.

He was proud to consider himself captain of Grandfather Mountain's preservation, aiming to maintain the property in its natural state. We all feel that same responsibility, and as we see our mission fulfilled, we are proud of our affiliation. I don't think this pride in ownership is boastful or arrogant; rather, I see it as a satisfaction derived from knowing that our family has kept something pure and beautiful since 20 years after the Civil War ended, during a century when development was ubiquitous in nearly every corner of every state.

To see my grandfather grin when approached at a University of North Carolina basketball game, camera around his neck, and someone asked, "Hugh, how are things up on your mountain?" gave me a warm feeling. He was proud of the association, and the mountain was synonymous with Hugh Morton. All of that said, I don't know if he would've accepted the offer of purchase or not. No one will ever know. But I know that he would be proud of the stalwart effort to maintain the property in its pure state, which in turn is a wonderful pun. He loved North Carolina nearly as much as his mountain, so seeing the property change over to state ownership would, I believe, make him quite happy.

For me, it has been a challenge. As I said before, Grandfather has been my playground for more than 30 years. I played catch with my dad in MacRae Meadows, sledded the slopes on snowy days, wore the bear costumes during the summer months, marched in the Highland Games and filmed the fall color from above, hanging out of a helicopter



1968 — Grandfather Mountain section of Blue Ridge Parkway opens.

1973 — Purchased two black bears; one of these is the iconic Mildred.

Bear Habitat constructed for Mildred and other bears.

1987 — Linn Cove Viaduct completed after construction started 35 years earlier in 1952.

1989 — Nature Museum at Grandfather Mountain opens.

1990 — Hugh Morton donates acreage, parcels to The Nature Conservancy.

like a gunner in Vietnam. After meeting my future wife Adrienne at my brother's wedding, the first place I brought the native Texan on her seeond visit to North Carolina was Grandfather, and we hiked as we got to know one another.

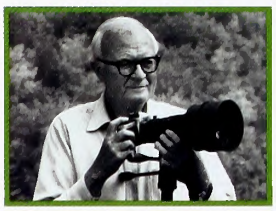
We have all eome and gone multiple times; my dad worked there at least four different times, my unele Jim the same. My brother, Crae Morton, has been president for nearly six years, and my aunt Catherine Morton oversees marketing. I spent several months there in the summer and fall of 2006, taking photos and working in a publie relations eapaeity after my granddad died. It has always had a lure, a unique ability to draw me, and my dad for that matter, like a magnet up to Avery County from toasty Raleigh. I never permanently reloeated to Linville but know it like the baek of my hand.

I shared my hesitation with my family. I thought it would be eathartic to be open with them about the fear I felt in losing ownership. It has always been an element to my identity, beeause of my being born into it and living my entire life in North Carolina. But as I graduˈally allowed my defense mechanism to erode, I realized the numerous benefits of Grandfather Mountain's becoming a state park. Above all else, we have always eonsidered it to be for the people, and in agreeing to this transaction we are merely making that a reality.

Now we move forward, with the willing and able Penn Dameron taking the reins as exeeutive direetor. Most reeently exeeutive direetor of the Blue Ridge National Heritage Area, Penn spent 30 years as a trial lawyer and superior eourt judge. Fittingly, he worked elosely with my granddad as the ehairman of Western North Carolina Tomorrow, and as a member of the Year of the Mountains Commission. Penn is also a former Grandfather Mountain employee, having worked there during eollege summers in the late 1960s.

Yes, it is odd to visualize a non-family member running Grandfather Mountain; but I've eome to realize that it's difficult to fathom simply beeause it's never happened before, and for no other reason. Nearly 2,500 aeres of the property now belong to North Carolina, and with Dameron drawing upon personal wisdom and experienee as well as the assistanee of our family, I firmly believe Grandfather Mountain is, if possible, climbing even higher into the sky.

During a reeent meeting, my unele Jim Morton said something that left an impression, a statement that perfeetly summarizes my feelings and emotions on the matter. "I feel like Grandfather Mountain will finally be reaching its full potential," Jim said. And it's so true. Every person, every family



Hugh Morton 1921–2006

2008

2006

Announcement made that State of North Carolina to purchase Grandfather Mountain business and properties to become 34th state park in N.C.

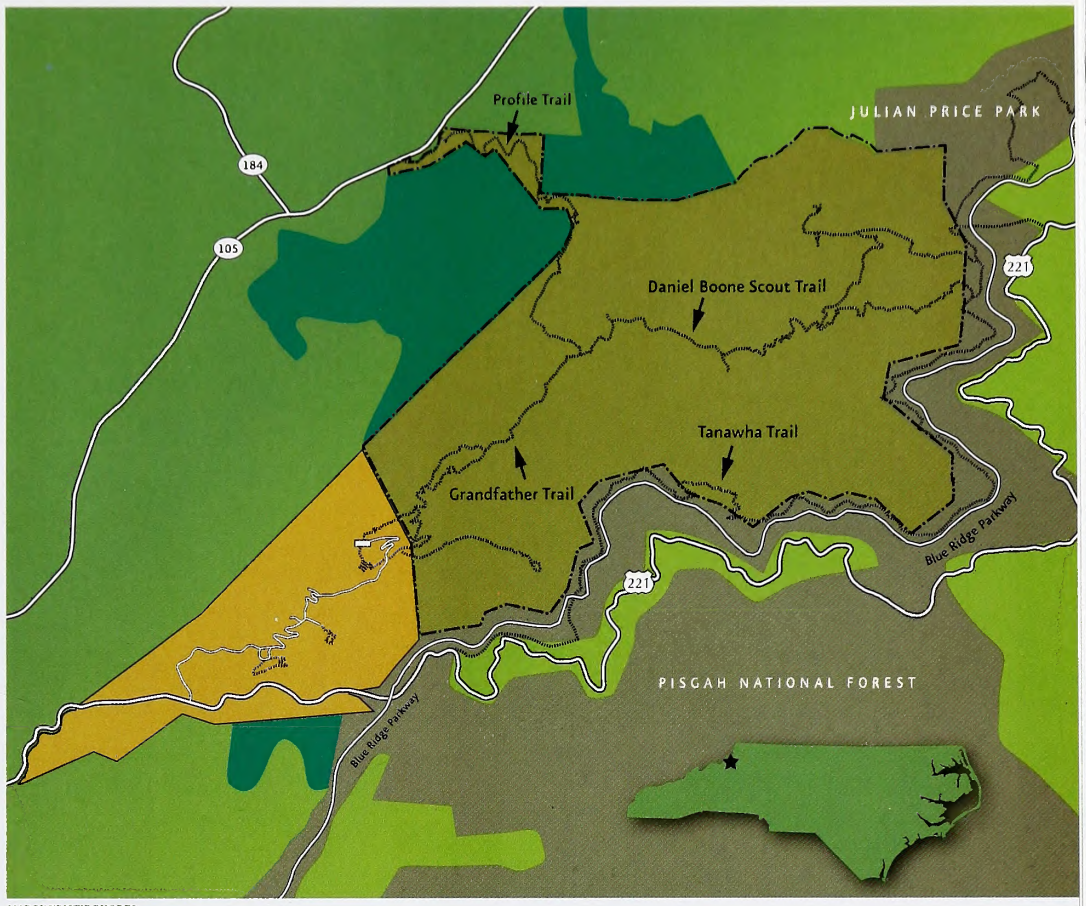
The Morton family, seen in this family outing from the mid-1960s, has remained a fixture at Grandfather. From left are Catherine, Julia, Hugh Sr., Jim, Judy and Hugh Jr. The image of this whitetail buck (below left) is one of the most familiar and striking images from the mountain taken by Hugh Morton Sr. Morton's photos were often used for Grandfather Mountain postcards. The one below shows Darby Hinton, the young actor who played Daniel Boone's son on the 1960s television show, posing with Mildred.

member to this point has overseen or helped write a chapter in the mountain's book, and each person's role has been critical to getting us to this point. Now we have a chance to reach that potential, moving forward into an era when "going green" and being eco-friendly are more important than ever and will likely be even more essential in the future.

The purchase of Grandfather Mountain by the state of North Carolina ensures that this unique property will continue to serve North Carolinians as a peaceful retreat. As our state develops at a breakneck speed, such serene escapes are that much rarer. So continue to enjoy it for the reason it's special to you, be it the views, the hiking, the animals or the memories of going up there as a child. The torch is being passed from the Morton family to North Carolinians across the state, and I feel confident you will treasure our peaks—your peaks—and protect and embrace them. I sound as if I'm conducting a wedding, and in many ways it feels like just that.

Jack Morton is a professional writer and photographer living in Raleigh and is a member of the board of directors of Grandfather Mountain Inc.

Grandfather Mountain Tracts and Boundaries



MAP BY KRISTIE RHODES
Source: The Nature Conservancy and Grandfather Mountain State Park

- Grandfather Mountain State Park
- Grandfather Mountain Attraction
- The Nature Conservancy Ownership
- Federal Conservation Lands
- Park Boundary
- Trail
- Road

The Morton family once owned much of Grandfather Mountain but now controls just 749 acres that make up the traditional tourist attraction. Much of the area around the mountain falls within Pisgah National Forest.

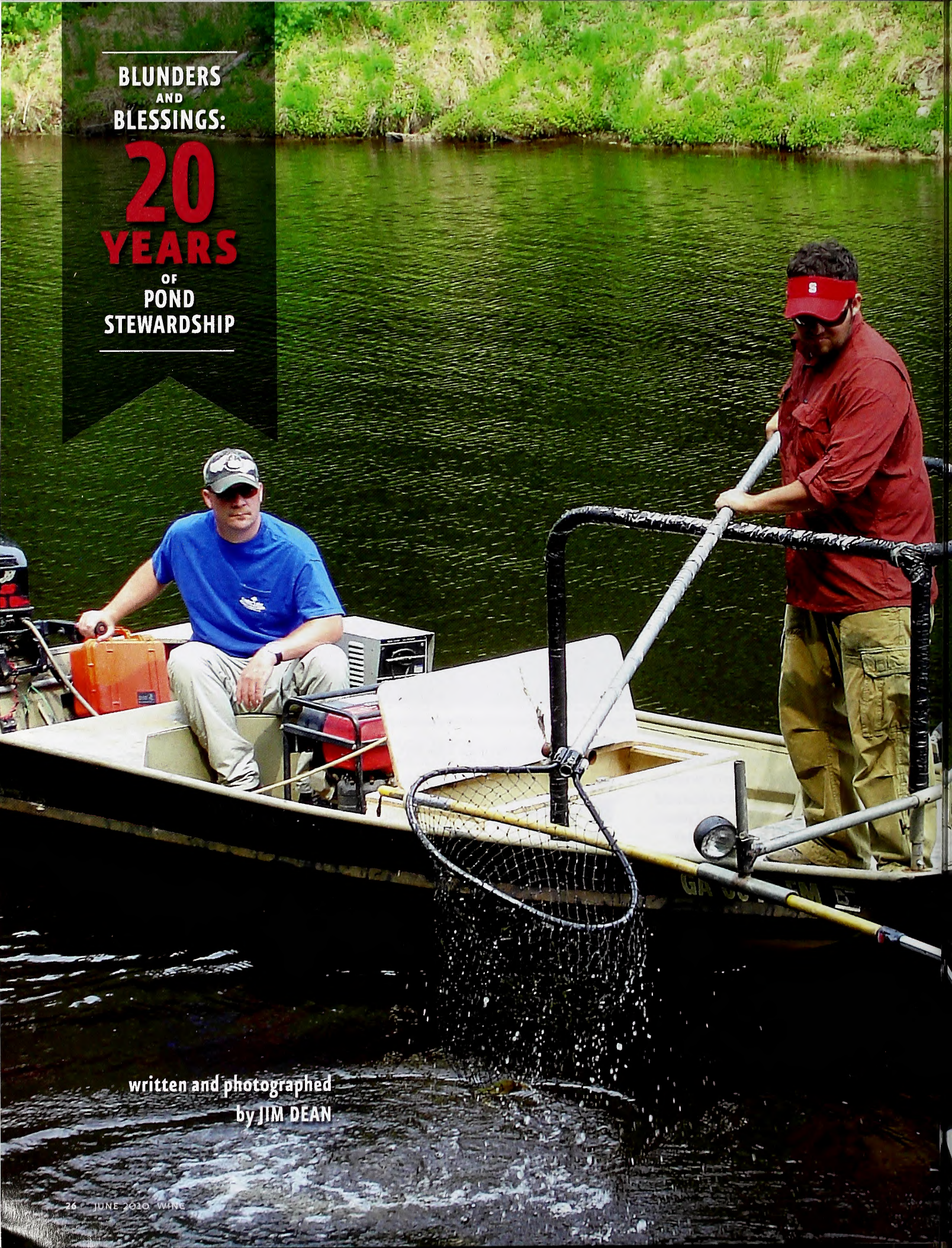
For more information

Tourist attraction:
www.grandfather.com
1-800-468-7325
State park:
www.ncparks.gov/visit/parks/grmo/main.php
(828) 297-7261

NATURE'S WAYS

Where Did The Vegetation On Grandfather Mountain Come From? See Nature's Ways, page 39.

BLUNDERS AND BLESSINGS: 20 YEARS OF POND STEWARDSHIP

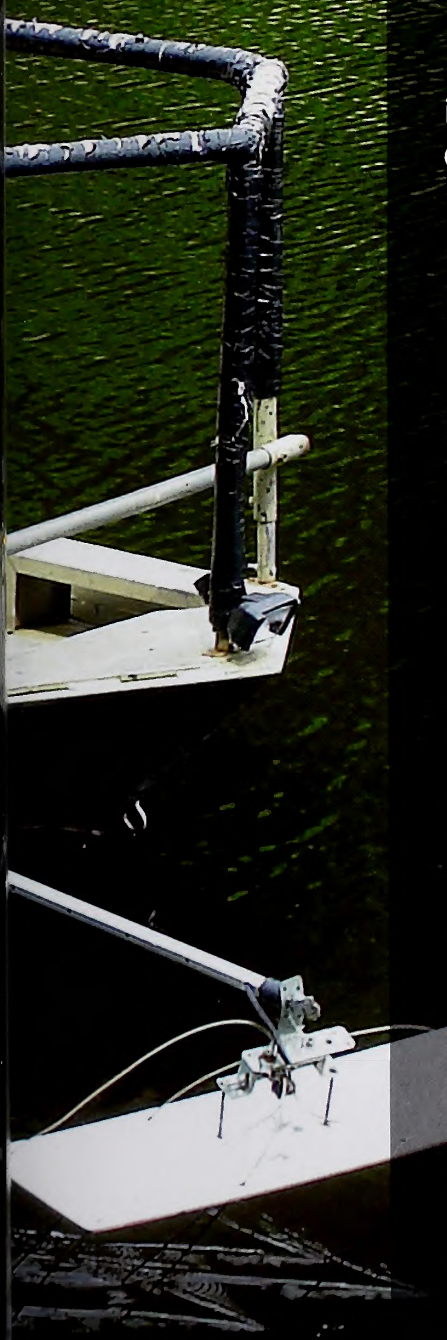


written and photographed by JIM DEAN

PART THREE

SEEKING HELP

IF YOU WANT TO IMPROVE THE FISHING IN A POND, OR BUILD A NEW ONE, HERE'S HOW TO GET STARTED.



"Mother Nature often has a way of giving you other than what you want," Rich Noble remarked when I told him of the unexpected problems I'd encountered while trying to improve the fishing in the ponds on my family's farm. No would-be pond manager—and certainly not I—would argue with that.

Rich is a professor emeritus of zoology and forestry at N.C. State University. In the earlier parts of this series, I related how he and Jim Rice, professor of zoology and extension fisheries specialist at N.C. State, drained two of our ponds as part of a student training exercise. Their analysis revealed that the overall fish populations were fairly normal for unfertilized, and essentially unmanaged, ponds, although I was astonished at how few sizeable bass we found. The decision to drain the ponds had been made not only because the fishing had declined but also in hopes of addressing other problems, including removal of undesirable species and clearing fallen timber. Draining those two ponds and starting over seemed to be our best option.

If you've followed this series, you've gotten at least a taste of some of the pleasures and pitfalls of pond management, and you may also avoid some of the mistakes I made. I hope this hasn't discouraged you from trying to restore fishing in a pond, or building a new one.

What follows are some tips as a starting point to guide you. This information is by no means complete because the subject is far too complicated to cover here. Indeed, you are encouraged to begin by contacting your county Cooperative Extension agent or fisheries biologists with the N.C. Wildlife Resources Commission for advice and initial analysis to get you headed in the right direction. At some point, you will also need the services of private companies or consultants for fish stocking and/or management. Visit ncwildlife.org/WINC for lists of sources of advice, assistance and related information.

SEEK PROFESSIONAL HELP

Your first step is to have the water chemistry in your pond checked, or the soil tested if you're planning a new pond. This can be accomplished by sending a water or soil sample to the N.C. Department of Agriculture and Consumer Services Solution Analysis lab (at a cost of $5). Your county Cooperative Extension agent can also handle water testing or provide soil sample boxes and send them to the lab. Some technical advice and limited on-site evaluation are available from fisheries biologists with the Wildlife Commission (though not soil testing). Beyond that point, you will have to contract with private commercial companies for other services, including fish stocking. Some commercial full-service pond-management companies can get you started with construction or restoration and also provide fish, weed control and other continuing services to help you maintain your pond. You can also do some of the work yourself, contracting for

other services such as supplemental stocking, extensive weed control or beaver removal as needed. Always, however, follow the advice of trained professionals.

CHOOSE POND SITES WISELY

With professional assistance, choose a site with good drainage and soil that will adequately hold water and make a solid dam. Be aware that permits may be required before building any pond. Avoid locating a pond where livestock will have access to it. A 1- to 2-acre pond in an open area is easier and less costly to build and manage, but bigger ponds have greater potential for good fishing. Ideally, a small new pond in a field or pasture will require a 5- to 20-acre watershed, and a woodland pond needs a 20- to 40-acre watershed. Keep in mind that using a pond for irrigation may limit its potential for fishing.

A maximum depth of 8 to 10 feet is adequate and will limit hot-weather deep "dead" zones that lack sufficient oxygen. Banks should not be too steep (no more than a 3-to-1 grade), but avoid large expanses of shallow water to discourage undue weed growth. A few rock piles or anchored logs can provide cover, but don't overdo it, and never leave standing timber in a pond.

A simple grass spillway may be adequate for small ponds, but a standpipe system that gives you control to raise or lower water levels is much better and will permit beneficial annual winter drawdowns or draining. This option, however, is considerably more expensive. If you go this route, choose a system with proven reliability, and avoid using a gate valve (they often fail). During construction, consider adding a small catch basin at the head of the pond to trap silt and help prevent muddy water.

STOCK WITH CARE

Fish for stocking are no longer available through government agencies, so you will have to contract with a private service to obtain them. Most ponds are stocked with fry or 1- to 3-inch fingerlings, and it takes two or three years before they reach keeper size (though you can release bass and begin to cull panfish earlier).

The species most highly recommended for warm-water ponds are largemouth bass, bluegills and redear sunfish (shellcrackers). Channel catfish are also recommended because they add a useful predator that does not compete with bass. Sometimes, fathead minnows are added to new ponds as forage to promote initial bass growth, but many experts consider them unnecessary, and they are a waste of money in established ponds. Sterile grass carp are sometimes recommended if various types of submersed aquatic weeds become a problem.

Resist the temptation to add other species, especially crappies, green sunfish, bullheads or golden shiners. Indeed, even the use of shiners as live bait is not recommended because some will surely escape and multiply. Also, be dubious of suggestions to stock hybrid panfish — often advertised as "giant panfish" — because you are likely to regret it. Indeed, add no other species without first consulting with a fisheries professional.

The number and species of fish stocked per acre follow a set formula. For all fingerling stocking, the formula is 350 bluegills, 150 shellcrackers and 50 bass per acre. Channel catfish are stocked at 50 per acre. Fathead minnows, if you choose to include them initially, are stocked at 10 pounds per acre. Young grass carp may be stocked at three to five per acre initially to help prevent certain weeds from getting started in large areas of shallow water. If aquatic vegetation is already a problem in an established pond, grass carp are typically stocked at 10 to 20 fish per acre depending upon the species of aquatic vegetation encountered. On average, the most frequent recommendation is 15 grass carp per acre with fish 8 to 10 inches long.

This formula is recommended by both Keith Ashley, Wildlife Commission biologist, and Mitchell Morton of Foster Lake and Pond Management (the private pond service that has helped manage our family's ponds). If you are committed to a continuing program of pond fertilization, the fish in the initial stocking can be doubled (except for carp) because a fertilized pond will support more fish. Typically, bluegills and shellcrackers are stocked in October, and bass and catfish are stocked the following spring.

After all of the work has been done and new fish stocked, the payoff comes with continued diligent management of the pond.

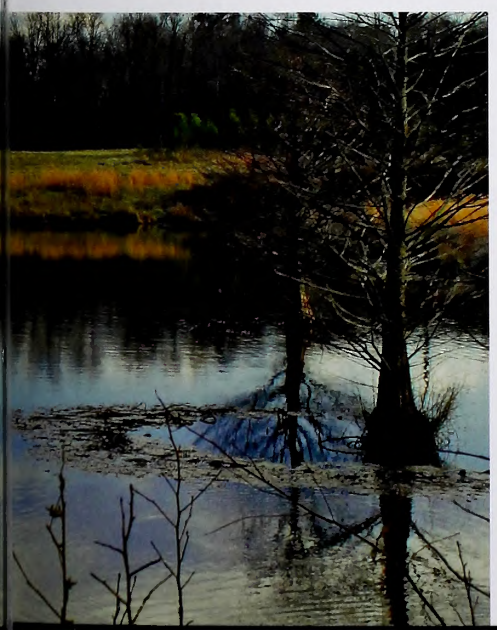
ONCE A POND IS ESTABLISHED, THE ANGLER CAN HELP BY REMOVING PANFISH AGGRESSIVELY (IT'S HARD TO TAKE TOO MANY) AND RELEASING BASS.

The alternative of stocking adult fish instead of fingerlings is more expensive but worth considering. It is easier to identify the species, and fish reach catchable size more quickly. Ashley recommends that new ponds stocked with adult fish follow the formula of 100 3- to 5-inch bluegills per acre (or 70 bluegills and 30 shellcrackers), and 20 8- to 14-inch bass. With adult fish, all can be stocked at the same time in April.

Once a pond is established, the angler can help by removing panfish aggressively (it's hard to take too many) and releasing bass. If bass become skinny and stunted, removing some of the smaller bass in the 10- to 14-inch range can improve growth and produce bigger bass. Adult fish — especially bass or channel catfish — can be stocked in an established pond to adjust population imbalances, and grass carp for weed control can also be stocked later.

FERTILIZE RESPONSIBLY

Many biologists and pond managers discourage pond fertilization. True, a properly fertilized pond will grow more and bigger fish, but few pond owners are willing or able to commit the necessary time and resources, and it is difficult to cull enough panfish to maintain the desired balance. Morton suggests that pond owners allow a newly stocked pond to go through a full growing season before making a decision to fertilize.



Liquid or powder fertilizer is applied in spring. Morton's company uses 10 (nitrogen) -52 (phosphoric acid) -4 (potash). The bloom is judged to be adequate when the water turns greenish and visibility drops to 18 to 24 inches. Once this bloom is established, some managers recommend that it be maintained with additional applications through the summer. A proper bloom will inhibit weed growth, but if fertilizer is initially applied too late in the season, it can actually increase weed problems.

A few pond owners regularly feed their fish with commercial fish feed in pellet form to increase their growth. This can be effective, particularly on smaller ponds, but it can be costly and is time-consuming to maintain on a regular schedule. Pellets can be scattered by hand, or from a timed-release device. Many anglers find this unappealing, however, because it results in a somewhat artificial fishery, not unlike a hatchery. It is important to note that Ashley warns against feeding fish in a fertilized pond because this essentially doubles the dose of fertilizer, with undesirable results.

WEEDS NEVER SLEEP

Very few ponds escape weed problems. Some experts consider sterile grass carp the best, and least troublesome, long-term solution for controlling certain kinds of weeds, including hydrilla. If your pond develops weed problems, you should consult a biologist, extension agent or private company to identify the weeds and make recommendations regarding their control or elimination.

There are several over-the-counter products available at farm supply stores that will control most emergent weeds (those that protrude above the water surface). These aquatic herbicides are developed specifically for use in water but won't harm fish. They can be mixed (per label instructions) with water and applied with hand-pump or electric sprayers. But remember, correct weed identification is the key to choosing the right herbicide, and always follow the directions on the label.

For more serious weed infestations that you are unable to control — watermeal, watershield, duckweed and some submerged aquatics — you will most likely need to contract with a private pond management service. Products such as Sonar and Navigate (systemic controls may work for up to a year) are surprisingly expensive and should be applied only by professionals.

PESTS NEVER SLEEP, EITHER

If your pond attracts beavers, muskrats and otters — and surely some of these will find homes there — you may need to control them. Beavers are a particular nuisance because they damage timber and threaten the pond's dam by clogging the spillway or tunneling into it to build lodges, and they must be periodically trapped. No other workable solution has been found. Muskrats are less troublesome but also tunnel into dams. A family of otters can eat a lot of fish, and though some predation might be a good thing, otters are indifferent to your hopes for quality fishing.

These intruders require the attention of professionals to inspect your situation and make recommendations for control within the law. (Cooperative Extension maintains a certification program for animal damage control services, listed by county.)

You may also have problems with two-legged pests. Poaching can be a big problem on some ponds, especially if the poachers are persistent and keep all your bass. Posting the land, registering it with the local sheriff, locking gates and keeping a sharp eye may be your only choices.

THE PAYOFF

At this point, you may be thinking that pond stewardship is more trouble than it's worth. Certainly, there have been times over the past 20 years when I would have heartily agreed. But there will be days when the chores are done, the weather is perfect and the fish (your fish) are biting. On balance, I consider myself blessed to have ponds I can fish at my leisure, and tending to them has been largely pleasurable. But if that's not reward enough, go with your buddies to fish their ponds.

Jim Dean is the former editor of Wildlife in North Carolina *and is its longtime Our Natural Heritage columnist.*

WILDLIFE IN NORTH CAROLINA

2010 PHOTO COMPETITION

FOR OUR SIXTH ANNUAL PHOTO COMPETITION, *Wildlife in North Carolina* magazine is emphasizing quality over quantity. Last year, we received more than 8,800 entries — by far our most ever, and almost too many for our staff to handle. In response, we are reducing the number of photos you can enter in a category from three to two. We hope that this change will raise the quality of the overall pool of images.

Our founding partner, the N.C. Museum of Natural Sciences, returns as a co-sponsor. The museum is a fantastic place to learn about North Carolina's wildlife and wild places. Another co-sponsor, the N.C. Division of Parks and Recreation, manages North Carolina's outstanding state parks. These are ideal places to photograph wild animals and wild landscapes. Park rangers can give photographers expert advice on the best subjects, locations and times of year for nature photography in state parks. Thanks to co-sponsor UNC-TV, you don't have to leave home to become educated about our state's wonderful natural resources — just turn on North Carolina Public Television's programming.

Beautiful nature photos from North Carolina have inspired generations of people to be better stewards of our precious natural resources. Excellent wildlife photography taken in state parks and other conservation lands across the Mountains, Piedmont and Coastal Plain has been the cornerstone of *Wildlife in North Carolina* magazine, of exhibits at the N.C. Museum of Natural Sciences, and of programming on UNC-TV for many decades.

The *Wildlife in North Carolina* Photo Competition aims to encourage people to participate in nature photography, thereby fostering greater understanding and appreciation of North Carolina's wildlife and wild places. Winning photographs will be published in the January 2011 issue of *Wildlife in North Carolina*. Thanks to our exhibition sponsor, JW Photo Labs of Raleigh, the winners will also be exhibited at the Museum of Natural Sciences and at other science museums and wildlife education centers across the state in 2011.

Visit www.ncwildlife.org, the museum, any of North Carolina's 40 state parks, or any of the seven statewide locations of our corporate sponsor, Great Outdoor Provision Co., for more information about the competition. Then get outside and show us your best nature photography!

WES GUBITZ

Even North Carolina's most common wildlife species can make for great photos if you are willing to spend the time to watch their behavior and catch them doing something interesting.

2010 COMPETITION RULES

WHO MAY ENTER

Amateur and professional photographers, except for employees of the N.C. Wildlife Resources Commission, the N.C. Museum of Natural Sciences, the N.C. Division of Parks & Recreation and UNC-TV, and their immediate families (children, siblings and spouses).

WHAT TO ENTER

Photos will be judged in 10 categories:

Birds

Mammals

Reptiles and Amphibians

Invertebrates

Wild Landscapes: The peaks, valleys, plains and beaches of North Carolina.

Wild Plants: Wild-growing plants only, including their flowers, leaves, fruits and other parts. Absolutely no cultivated plants will be accepted. Mushrooms and other fungi should be entered in this category.

Outdoor Recreation: Show how people interact with North Carolina's natural world through activities that are inextricably linked to nature, such as hunting, fishing, hiking, rock climbing or canoeing.

Animal Behavior: Anything animals do, from everyday activities to interactions with other animals to unusual behavior.

Youth Photographer, 13–17: Any of the above subjects, shot by photographers under 18.

Youth Photographer, 12 and under: Any of the above subjects, shot by children 12 and younger.

Photographs must have been taken in North Carolina no earlier than Sept. 15, 2005.

You must declare on your entry form if your photograph is of an animal in captivity, such as at a zoo, nature center or rehabilitation facility. Please do not enter photos of animals that are both captive and non-native to North Carolina (for example, polar bears or lions at the N.C. Zoo).

No pets or domestic animals will be accepted, with the exception of animals participating with people in outdoor recreation (for example, hunting dogs or riders on horseback).

Please do not harass wildlife in an attempt to photograph it.

Manipulation of images, either film or digital, should be limited to conventional darkroom techniques or basic sharpening and cropping. Images should contain only the subject matter as originally seen through the viewfinder. Multiple exposures, digitally stitched photos and images containing any manipulated or added content will not be accepted and should not be entered.

Entries may not contain any text aside from that contained in the subject matter. Date stamps, signatures and trail camera information are not permitted, regardless of whether they are added during or after the image is photographed. Original images may be cropped to eliminate date stamps or other text.

An entrant must hold all rights to a photograph. Photos previously published or pending publication, or that violate or infringe upon another person's copyright, are not eligible. Please do not infringe on the rights of property owners in an attempt to photograph animals.

HOW TO ENTER

Visit **www.ncwildlife.org**, click on the Photo Competition link, and then click the **Enter a Photo** link to submit a photograph. Only JPG files smaller than 2 MB will be accepted for upload. Upload your photo using the online entry form on the website. Repeat this process for each photo entered. Entrants may submit a maximum of two (2) photos per category.

The competition begins at 8 a.m. on June 1, 2010. Entries must be uploaded by 5 p.m. on Wednesday, Sept. 1, 2010. Entrants may verify receipt of entries by checking www.ncwildlife.org and clicking the Photo Competition link to view a text list of all entries.

An image may be entered in only one category. For instance, if a photo of a wood duck preening might fit in Birds or Animal Behavior, you must choose the one category in which you want the image to compete.

Entrants in the youth categories must be the appropriate age for the category entered on the closing date of the competition. Once a youth photographer has entered two photos in the proper youth category, they may enter other photos in any other categories they wish.

PRIZES

All winners will be published in the January 2011 issue of *Wildlife in North Carolina* magazine and exhibited at the N.C. Museum of Natural Sciences in Raleigh. Winners will also receive a print of their winning entry from JW Photo Labs of Raleigh and products from sponsor Great Outdoor Provision Co.

Grand prize: Your photo published on the cover of the January 2011 issue of *Wildlife in North Carolina* magazine, plus $200.

First place, all categories: $100.

Second place, all categories: $75.

Third place, all categories: $50.

Special state parks prize: One photo taken in North Carolina state parks, regardless of category, will be selected as Best of State Parks. The winner will receive camping passes at their choice of North Carolina state parks and other noncash prizes to be determined. Finalists in consideration for this honor will be exhibited at various parks across the state.

JUDGES

Winners will be selected by a panel comprised of staff of the N.C. Wildlife Resources Commission, the N.C. Museum of Natural Sciences, the N.C. Division of Parks and Recreation and professional wildlife photographers.

THE FINE PRINT

By entering the *Wildlife in North Carolina* 2010 Photo Competition, entrants grant all sponsors the right to publish and use submitted photographs in print or electronic form to promote the competition. Reproduction of entries will include photographer credit.

Entrants agree that if their submission is selected as a winner, they grant all sponsors the right to display their photograph(s) at venues including but not limited to the N.C. Museum of Natural Sciences. Exhibition of entries will include photographer credit.

Entrants will be asked on the online entry form if their photo was taken in a North Carolina state park. All such entries will be provided to the N.C. Division of Parks and Recreation for possible usage in public information or promotional materials, park displays or agency press releases to various statewide media outlets. Any such usage will include photographer credit.

Winners will be required to provide original source material — slides, high-resolution digital files or negatives — for reproduction in the magazine and for exhibition prints. Original digital files of winning photos must be accompanied by a color print of at least 4x6 inches.

Wildlife in North Carolina staff will determine entry eligibility.

QUESTIONS?

Please do not call about entries. Send questions to competition@ncwildlife.org.

Enter online at www.ncwildlife.org.

Parents of most baby animals don't spend their days in offices and their evenings on family room couches. Instead, bluebirds, foxes, dolphins and other young creatures have

Moms and Dads Gone WILD

written by Julie Dunlap / illustrated by Consie Powell / nature activity by Anne M. Runyon

Parenting human children takes lots of time and energy. Moms and dads cook, clean, shop, coach and earn money to support the family. It must be easier being a giant clam mom, who releases a billion eggs to float away in the sea, than a busy parent of two grade-school kids.

Most young creatures receive little or no parental care. Usually, insects, fish, amphibians and reptiles spend their energies having large numbers of offspring. Without parental care, many die. Just a few live to have young of their own.

Most birds, all mammals, and some other animals have a different parenting strategy. They devote days, weeks or even years to protecting, feeding and teaching just a few babies. It's tough growing up in the wild, but caring parents can help make sure their little ones survive.

BE PREPARED

Parents in nature prepare for their babies' arrival by finding—or building—a safe place for their newborns. A monarch butterfly's only parenting job is to find a milkweed plant. She must lay her eggs on milkweed, the one food her caterpillars can eat. Sandy soil is what a snapping turtle seeks to dig her nest. The hatchlings will never meet her, but her buried eggs stay hidden from hungry raccoons.

Some animal parents rely on a variety of dens, burrows, nests or shelters. A grassy scrape on the ground is all bobwhites need for their eggs; their fluffy, active chicks can leave it just hours after hatching. Blind, helpless baby squirrels need more protection, so their moms make leafy, treetop nests, lined with soft fur. Beaver parents may spend months constructing a dry family lodge of branches and mud, while red-cockaded woodpeckers hammer at a living pine tree for up to three years to carve one nest hole.

Other wild parents camp out together. Hundreds of little brown bat mothers may collect in a hollow tree to give birth. That way, their young can huddle together for warmth when the moms fly out at night to hunt. Like many female animals, little brown bat mothers are hardworking single parents, without any help from their mates.

LEAST WEASELS

TASTES OF NATURE

Wildlife parents can't bring home burgers from a drive-thru. Instead, mammal moms offer nature's best fast food: milk. Every female mammal cooks up just the right milk recipe for her newborns. Dolphins and other fast-growing species need extra-creamy milk, while deer fawns and others that start eating soon after birth need a less fatty drink. Nursing time also gives mom a chance to lick her babies clean, another way she helps them stay healthy.

Non-milk-making moms and dads must still supply nutritious food for their babies. Potter wasps lay one egg in each nest hole, then stuff a paralyzed caterpillar inside for the hatchling to eat later. Bluebird parents make dozens of caterpillar-delivery trips daily, exhausting themselves to fill their nestlings' gaping mouths. Baby pelicans poke inside pouches on their parents' bills to grab fresh fish, and coyote pups demand fresh meat daily once they outgrow milky meals. Coyotes lack bill-pouches, though, so parents tote home chewed-and-swallowed prey in their stomachs and regurgitate it for their yapping pups.

BROWN PELICANS

CANADA GEESE

WILD BATTLES

Sometimes, parents' comings and goings attract enemies to a burrow or den. Adult animals without families usually escape if a predator appears. But if they have babies to defend, parents may risk their own lives by staying to fight.

A Canada goose will hiss, bite and flap its wings at an egg-stealing fox. A stallion on Shackleford Banks will squeal a warning that sends his mares and foals running, while he stays behind to kick a dog that comes too close. If an opossum finds a killdeer nest, the parent bird cries and runs off, dragging its wing, to lure the predator away. When the opossum catches up—whoosh!—the bird can fly again. Animal parents will use any weapon—beaks, hooves, claws, teeth or even trickery—to save their young.

SCHOOL OF THE WILDERNESS

Some young animals can brave the wilds alone just days or weeks after birth or hatching. But others stay with parents for months or even longer. They need more time to learn important life skills. By watching and copying their parents, young animals learn how to spot enemies, which potential foods are beneficial and which are poisonous, and where to find dinner or a safe hideout. Even though a fledgling song sparrow looks full-grown, he needs his parents' examples to help him master flying, singing and catching swift-flying insects.

SONG SPARROWS

RED WOLF PUPS

Some of a young animal's most important lessons come from play. A father wolf may bring home a live mouse for his pups to chase. While they're enjoying a catching game, the pups learn how to catch and kill a tasty snack. Simply tumbling and play-fighting with parents and siblings helps build strong muscles, quick reflexes and healthy family bonds. Learning how to get along in a family is one of the most important skills young animals ever learn. After all, this spring's baby animals will be wild parents themselves someday.

Get Outside

Go out on parent patrol. How many parents and baby animals can you find? Look around ponds for duck nests and beaver lodges and check the woods for woodpecker holes and fox dens. Inspect your back yard too, in case wrens have started housekeeping in a bird box or a woodchuck family is hiding under your porch. Even if you don't see baby birds, you may spot parents carrying nesting materials or caterpillars into the trees. Listen, too, for chirps and other noises that might help you find a nest. Make notes or sketches about what you see and hear. But be careful not to disturb any nests or young. If you think you've found a lost fawn or abandoned nestlings, check with your own parents before you try to help the young ones. Usually, the wild mom or dad is nearby, just waiting until it's safe to go home again. And if the babies you find are really orphans, contact a trained wildlife rehabilitator to learn how to keep the young alive.

Read and Find Out

- "A Natural History of Parenting" by Susan Allport, Random House, 1997.
- "A Father's Day Top Ten" by Susan Goodman, National Wildlife Magazine, June–July, 1996.
- "Animals and Their Young" by Pamela Hickman, Kids Can Press, 2003.
- "The Parenting Game" by Jan Welsh, Minnesota Conservation Volunteer, March–April, 2005.
- "I Wonder Why Kangaroos Have Pouches and Other Questions about Baby Animals" by Jenny Wood, Kingfisher, 1996.

In *Wildlife in North Carolina:*

- "Born in the Wild" by Michael Phillips, September 1989.

On the World Wide Web:

- PBS Nova Online: "Animal Super-Dads" (1997) www.pbs.org/wgbh/nova/seahorse/superdads.html
- PBS film: "Baby Tales" (1996) www.pbs.org/wnet/nature/episodes/baby-tales/introduction/1996

Find out more about Project WILD Workshops and literature at the Wildlife Commission's Web site at www.ncwildlife.org.

Make a Papa Bluebird Sculpture

Copy on heavy paper. (67 lb. cardstock works well)
Cut out designs.

Head, Wings and Back:

1) Fold body in half along center line.
2) Crease down along lines above each eye, sculpting your bird's head and beak.
3) Curl chin under and glue head together.
4) Fold legs down along blue edges.
5) Staple long thread to **X** on back.

Chest:

1) Cut two side slits, overlap and glue to sculpt a fat tummy.
2) Slide top of chest under chin, and glue.
3) Center bottom of chest under legs, and glue to back.
4) Fold legs against chest, and gently curl wings down a little.

Now your papa bluebird is ready to glean insects from the leaves to feed his hungry nestlings.

This activity may be downloaded at www.ncwildlife.org, the magazine page, and copied for educational purposes.

Commission Ramps Up Access Area Work

Boaters in North Carolina have better, easier access to the state's waters thanks to a productive period from the N.C. Wildlife Resources Commission's Division of Engineering Services.

Workers have renovated, replaced, built or are working on some 20 Boating Access Areas (BAAs) from the mountains to the coast. The projects range from renovating the Trails End and Sunset Harbor sites on the Intracoastal Waterway to renovating a popular Roanoke River boat ramp that's swarmed with anglers during striped bass season.

"Staff has really stepped up to the plate to do some major renovations and building of new ramps, and the public will really benefit with easier, better access to North Carolina's waters," said Erik Christofferson, chief of the Division of Engineering Services. "We've calculated that the impact is about 1,000 more parking spaces every day for visitors to the ramps."

Money from the sale of Coastal Recreational Fishing Licenses (CRFL) and the N.C. Waterfront Access and Marine Industry Fund (WAMI) has made some of the projects possible, allowing the commission to focus on other boating projects. Both CRFL and WAMI provide grants to conserve the state's marine resources, including public access.

NCWRC

MELISSA MCGAW / NCWRC

The Wildlife Resources Commission's Division of Engineering has been busy on Boating Access Areas, with work scheduled or completed at 20 locations across the state.

"Several surveys have shown that both recreational and commercial saltwater fishermen believe there are too few water access sites along the coast to meet their needs," said Louis Daniel, director of the N.C. Division of Marine Fisheries. "The Division of Marine Fisheries has been glad for the opportunity to work with the Wildlife Resources Commission, to increase coastal fishing access through the Waterfront Access and Marine Industry Fund and Coastal Recreational Fishing License grants."

Over the winter, the commission built or performed major renovations on ramps in Weldon, Swan Quarter, several sites in Craven County, Sunset Harbor, Federal Point, Jamesville, Morehead City and Greenville, among others. Some of these sites are still under construction, so please check www.ncwildlife.org for the latest information on closings. Upcoming projects include an access area at Emerald Isle and Castle Street in Wilmington. Crews are also working on turning the Chowan River Bridge into a publicly accessible fishing area.

e NEWSLETTER
Get N.C. Wildlife Update—news including season dates, bag limits, legislative updates and more—delivered to your Inbox from the N.C. Wildlife Resources Commission. Sign up at www.ncwildlife.org/enews.

Storm Repeats as Duck Stamp Winner

"Carolina Snow Geese" by Minnesota native Scot Storm was selected as the 2010 North Carolina Waterfowl Conservation Stamp and Print.

The acrylic portrait, which depicts snow geese flying into a cornfield, was unveiled at the 15th Annual East Carolina Wildlife Arts Festival and the N.C. Decoy Carving Championships at the Washington Civic Center.

Representing the N.C. Wildlife Resources Commission at the unveiling were executive director Gordon Myers; commissioners Wes Seegars, Durwood Laughinghouse and Mitch St. Clair; and former wildlife commissioner and N.C. Representative Arthur Williams.

The unveiling of "Carolina Snow Geese" marks Storm's second honor as artist for the state's waterfowl conservation stamp and print, also known as the duck stamp. His painting "Surf Scoters over the Atlantic" was the North Carolina Waterfowl Conservation Stamp and Print in 2008. Last year, he placed third in North Carolina's competition.

Storm was one of more than 30 wildlife artists from across the United States to submit entries for the third annual State of North Carolina Waterfowl Conservation Stamp Competition. In 2008, the Wildlife Commission began partnering with the East Carolina Wildfowl Guild to conduct a nationwide competition open to the public.

This year, artists could submit portraits of snow geese, brant, Canada geese, tundra swan or gadwall. In addition to Storm's portrait, four other paintings, rounding out the top five entries as selected by a panel of judges on Jan. 25, were unveiled during the reception. They were:

2nd Place: Richard Clifton of Milford, Del.; snow geese
3rd Place: Gerald Putt of Boiling Springs, Pa.; gadwall
4th Place: Kreig Jacque of Riverside, Iowa; brant
5th Place: Tim Donovan of Lovettsville, Va.; snow geese

Signed and numbered regular edition prints with mint stamps of the winning portrait will be available from the commission on July 1 for $145. The stamp is $10. Visit www.ncwildlife.org or call 1-866-945-3746 to order.

Proceeds from sales of the print and stamps will go to the commission's Waterfowl Fund, which generates revenue for the conservation of waterfowl habitat in North Carolina.

CWD Hits Third State in Three-Month Span

In the first three months of 2010, chronic wasting disease (CWD) was discovered in three additional states. In March, North Dakota announced that a mule deer taken by a hunter last fall had tested positive for CWD. The fatal wasting disease was detected in Missouri in February and Virginia in January, bringing the total number of states where CWD occurs to 18. The disease also has been found in two Canadian provinces.

The North Dakota Game and Fish Department tested the animal as part of its targeted surveillance program, a year-round effort that tests animals found dead or sick. Since the department's sampling efforts began in 2002, more than 14,000 deer, elk and moose have tested negative for CWD.

The Missouri positive was a captive white-tailed deer inspected as part of the state's CWD surveillance and testing program.

The N.C. Wildlife Resources Commission is reminding citizens that anyone bringing a cervid (deer, elk, moose or caribou) carcass from North Dakota, the 17 other states or two provinces where CWD has been detected, must follow North Carolina processing and packaging regulations.

Other states where CWD has been detected are Colorado, Wyoming, South Dakota, Nebraska, Montana, Wisconsin, New Mexico, Minnesota, Oklahoma, Illinois, Utah, West Virginia, New York, Kansas and Michigan. It has also been detected in Canada's Alberta and Saskatchewan provinces.

To date, the N.C. Wildlife Resources Commission has tested more than 4,450 captive and free-ranging cervids in North Carolina for CWD, and no CWD has been found.

CWD affects the nervous system of members of the deer family and is always fatal. Scientists have found no evidence that CWD can be transmitted naturally to humans or livestock.

WISCONSIN DEPT. OF NATURAL RESOURCES

For more information on chronic wasting disease, including safety tips, visit www.ncwildlife.org or www.cwd-info.org.

CALENDAR OF EVENTS

SATURDAY, JUNE 5

Spend a day on the river with the children at Troutacular, a family fishing day in Spruce Pine. Prizes, crafts, food, vendors and music.
Visit www.mitchell-county.com

Kick off National Fishing and Boating Week by taking a child fishing from 9 a.m. to noon at the Youth Fishing Rodeo at Strayhorn Pond between Hillsborough and Chapel Hill. Call (919) 245-2660.

FRIDAY–SATURDAY, JUNE 11–19

Check out the 52nd annual Big Rock Blue Marlin Tournament in Morehead City. Call (252) 247-3575.
Visit www.thebigrock.com.

Readers should check with the contact listed before traveling to an event. Items for listing should be conservation-oriented and should be submitted at least four months in advance to jim.wilson@ncwildlife.org, or call (919) 707-0177.

IN SEASON

This month, these seasons are open in North Carolina:

Hatchery Supported Trout Waters: Through Feb. 28, 2011.

Crow: Wednesday, Friday and Saturday of each week between June 2 and Feb. 28, 2011, plus July 4, Labor Day, Thanksgiving, Christmas, New Year's Day and Martin Luther King Jr. Day.

There is no closed season or bag limit for groundhog, coyote, striped skunk and nutria. There is an open season for taking beaver with firearms during any other open season for the taking of wild animals.

Check the *2009–2010 North Carolina Inland Fishing, Hunting and Trapping Regulations Digest* for bag limits and applicable maps or visit www.ncwildlife.org.

Crappie Record Falls on Slow Morning

Although he spent the entire morning of March 8 fishing the Tar River Reservoir only to catch two fish, Tracey Smith of Nashville still considers the trip one of his most memorable, particularly since one of the two fish turned out to be the new state record white crappie.

Smith caught the 3-pound, 11-ounce fish, which measured 17 1/8 inches in length and 15 inches in girth, using a live minnow as bait.

According to Smith, he and a fishing buddy, Leonard Davis of Rocky Mount, had been fishing one spot on the reservoir all morning without much success. That is, until he boated the monster crappie and decided that "it was an awfully big fish."

After another nearby angler remarked that it was the biggest crappie he'd ever seen, Smith decided to weigh it on scales he had with him on the boat. Those scales weighed the fish at 3 pounds, 9 ounces, which would have broken by a mere 1 ounce the existing state record of 3 pounds, 8 ounces, held since March 30, 2009, by Ronnie Emory Jr. of Franklinton.

Knowing that he needed to have the fish weighed on certified scales to qualify as a state record, Smith kept the fish alive in a holding tank until he could have it weighed the next morning in Rocky Mount. That same day, Bill Collart, a fisheries biologist with the N.C. Wildlife Resources Commission, confirmed that the crappie was the new state record. The fish now rests in Smith's freezer until he decides whether to mount it or eat it.

According to Collart, some of the best white crappie populations are found in Piedmont reservoirs, such as the Tar River Reservoir. White crappies prefer structure and often are found near fallen trees, stumps, docks and thick stands of aquatic vegetation. This type of habitat is abundant in the Tar River Reservoir, which is known for producing large crappies, both black and white.

To qualify for the state record, anglers must have caught the fish by rod and reel or cane pole, have the fish weighed on a scale certified by the N.C. Department of Agriculture, witnessed by one observer, have the fish identified by a fisheries biologist from the commission and submit an application with a full, side-view photo of the fish.

For a list of all freshwater fish state records in North Carolina and more information on the State Record Fish Program, visit www.ncwildlife.org/fishing.

Commission's Regulations Digest Delayed

The *2010–2011 North Carolina Inland Fishing, Hunting and Trapping Regulations Digest* will be available by Aug. 1, one month later than usual. A handful of rules were sent to the General Assembly for action by the Rules Review Committee. The time frame in which the legislature could act on the rules made it impossible to include if the digest were published at its normal time.

Visit www.ncwildlife.org for updates on those rules and new rules that go into effect on Aug. 1.

Following review of public comments received online and at nine public hearings held across the state in January, the commission voted on the proposed regulations changes at its March meeting.

Approved was a proposal to open the season for red and gray squirrels on the Monday on or nearest to Oct. 15 and extend the season until the end of February in order to align it with other small-game seasons. The commission also allowed armadillos to be hunted all year and trapped during regular furbearer trapping season.

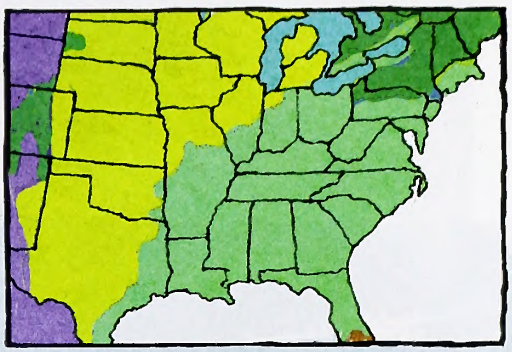
The commission voted not to remove the elk from the state's list of Special Concern species. Commissioners also voted down a proposal to prohibit the use of dogs for hunting deer on the Brinkleyville and Embro game lands, but approved a proposal to prohibit the use of dogs for hunting deer on Brunswick County Game Land.

Also approved were fishing proposals, including adding Wildcat Lake and almost two miles of Elk Hollow Branch in Avery County and a 2-mile portion of the Yadkin River in Caldwell County as designated Public Mountain Trout Waters. Another approved proposal designed to simplify muskellunge regulations will establish a 42-inch minimum size limit and one-fish-daily creel limit for muskies for the entire state. The commission also approved a reduction in the minimum length to 14 inches of largemouth bass caught in Jordan and Falls of the Neuse reservoirs.

Where Did The Vegetation On Grandfather Mountain Come From?

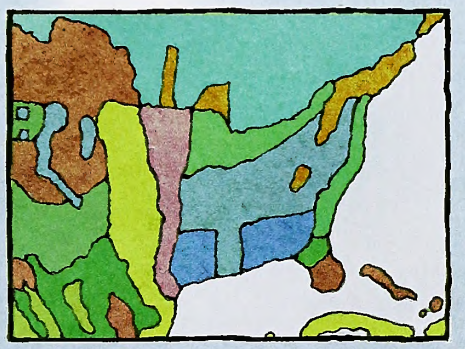
written by Clyde Sorenson
illustrated by Jim Brown

GRANDFATHER MOUNTAIN IS A SPECIAL PLACE with many plants and animals not found in most of the rest of North Carolina. The mountain's altitude is responsible for the unusual ecosystem found there.



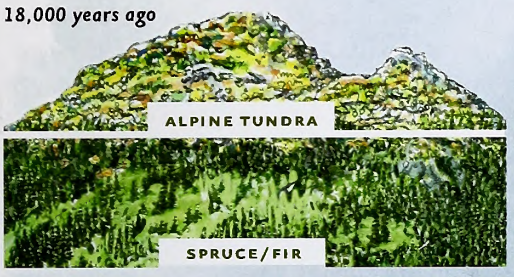
savannah forest boreal

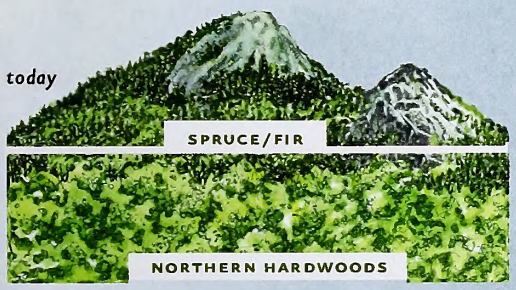
The plant community found at the summit is very similar to the great boreal forest that stretches across the northern third of North America, even though this forest is almost 1,000 miles away.



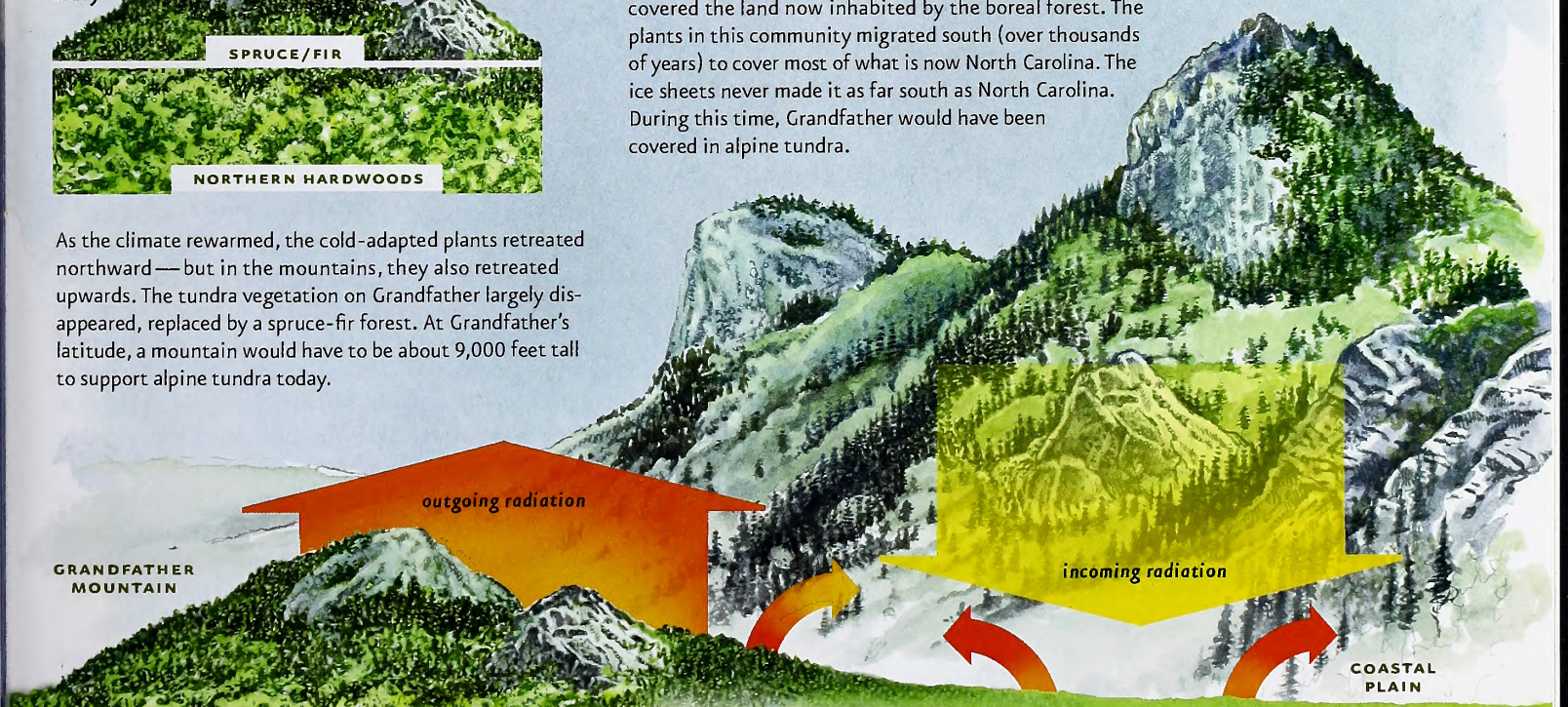
ice tundra boreal

During the last glacial maximum, ice thousands of feet thick covered the land now inhabited by the boreal forest. The plants in this community migrated south (over thousands of years) to cover most of what is now North Carolina. The ice sheets never made it as far south as North Carolina. During this time, Grandfather would have been covered in alpine tundra.





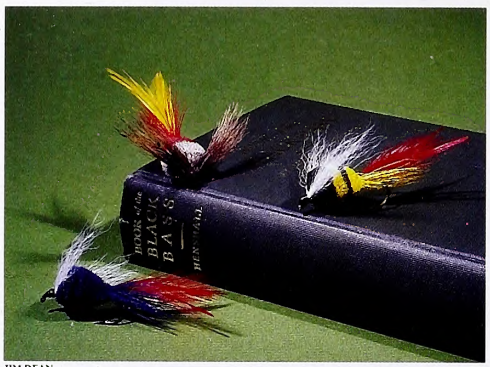
As the climate rewarmed, the cold-adapted plants retreated northward — but in the mountains, they also retreated upwards. The tundra vegetation on Grandfather largely disappeared, replaced by a spruce-fir forest. At Grandfather's latitude, a mountain would have to be about 9,000 feet tall to support alpine tundra today.



Why is it colder atop Grandfather, when it would seem it is closer to the sun than lower elevations? The surface of the earth absorbs most of the radiation coming in from the sun, and then releases it to the lower layers of the atmosphere. The higher one goes, the less of this re-radiated heat. Because of this, each 1,000-foot rise in elevation is equivalent, temperature-wise, to moving 300 miles north (in the Northern Hemisphere).

The Reluctant Bass Daddy

written by Jim Dean



JIM DEAN

Dr. James A. Henshall is remembered for having written that the bass is "pound-for-pound, the gamest fish that swims." That statement appeared in his classic "Book of the Black Bass," first published in 1881. The book was so well received that it was updated several times throughout his long life, the last edition appearing in 1931.

Henshall was the first prominent spokesman to champion bass over more popular and elite gamefish such as trout and salmon which were still tied to rich European fly-fishing traditions. Bass, on the other hand, were homegrown ruffians generally held in low esteem. Henshall's books began to change that dynamic, however, and as the popularity of bass fishing grew, Henshall became regarded as the Father of Bass Fishing.

"Henshall detested the newfangled bass lures and short-rod bait-casting tackle."

Henshall is quite rightly considered the founding father, but he is not the father of modern bass fishing as we know it today. In the first place, the bass that he held in such high regard is the smallmouth, not the largemouth that dominates today's bass fishing. Nor would most modern fisherman agree with Henshall's "pound-for-pound" assessment if pure power is the only measure.

More to the point, Henshall did not wish to be the father of modern bass fishing—indeed, quite the opposite. He argued all his life that there were only two honorable ways to fish for bass—with natural bait or with wet flies and deer-hair bugs using a fly rod—and he strongly disapproved of the changes he saw taking place in bass fishing.

In 1906, James Heddon carved the first floating wooden lure for bass, and other innovative anglers began to add their own creations. Some were designed to float, but many were sinking lures, spoons or spinner blades that were trolled. Fishing reels were still largely custom made (often by watchmakers), and were uncommon and expensive. Also, the long steel and greenheart rods in wide use at the time were poor choices for casting these new lures. By the 1920s, short casting rods made of steel and bamboo were becoming popular—some as short as 4 ½ feet—along with decent commercially made reels. Increasingly fishermen began using the overhead cast to deliver floating and sinking lures.

Indeed, it is this tactic that most closely mirrors today's image of classic bass fishing. But at the time, this method was highly controversial, and Henshall led the ranks of traditionalists who opposed it. Henshall detested the newfangled bass lures and short-rod bait-casting tackle, a position he made abundantly clear in the 1931 edition of his earlier book.

"There are," he wrote with dripping sarcasm, "at this present day of culture and refinement, a number of wooden nondescript monstrosities used in fishing, popularly known as 'plugs.' They are usually of elliptical shape, and armed with two or four cheap triangles or triple hooks, and with or without wings or propellers. They may be white, or painted with brilliant colors, and spotted, streaked, or striped. They are employed as casting baits, and swim or duck or dive, and wiggle and wabble, on or below the surface of the water.

"It is only fair to say, however, that they catch fish. They are used mostly by those who cast overhead with the short casting stick, called by courtesy a rod, and who consider fishing, not so much as a legitimate sport as a game, in which the fish has no chance whatever, being yanked or derricked out of its element in the shortest possible time."

This is not the manifesto of a man who would be happy in a 200-horsepower Ranger equipped with foot-controlled trolling motor, fish finders, pedestal seats and half a dozen "short casting sticks" armed with "nondescript monstrosities." One can only imagine what he might think of a wacky-rigged plastic worm or a televised bass tournament.

That said, I have to admit that a little part of me understands his resistance to change. I was bass fishing long before it became fashionable or competitive—indeed, way back when you didn't, in certain company, admit that you loved bass fishing. My grandfather and I skulled around old millponds, fished the black waters of the Chowan and Cashie rivers, and spent weeks each summer fishing the Little Alligator out of Fort Landing. His tackle was an ancient split-cane Heddon casting rod and Pflueger Supreme casting reel. His lures were glass-eyed wooden crippled minnows, Heddon Vamps, Oriental wigglers, and Johnson spoons and pork rinds.

I'm not certain Dr. Henshall would have been favorably disposed to join us—we represented his mortal enemies, after all—and I'm sure he would have offered a negative assessment of our "modern" tackle. But he might have been pleased to see that my fly box contained deer-hair bugs identical to those he designed over a century ago, and I'd like to think that he might have enjoyed smoking one of grandpa's Muriel Senators while we fished with those bugs. They still catch bass.

"If we can discover the meaning in the trilling of a frog, perhaps we may understand why it is for us not merely noise but a song of poetry and emotion."

—Adrian Forsyth

MICHAEL SHREVES

Cope's gray treefrog

OUTDOOR MOMENT

IN THE JULY ISSUE

MELISSA McGAW / NCWRC

FARMING WILD

At Hoke County's Raft Swamp Farms, the wildlife signals the seasons as much as the crops do.

SAILIN' ON

Atlantic sailfish are easy to find and difficult to catch off North Carolina's coast, but worth the effort.

TAILRACE TROUBLE

On the Catawba River below Lake James, one mistake in a canoe can prove very costly.

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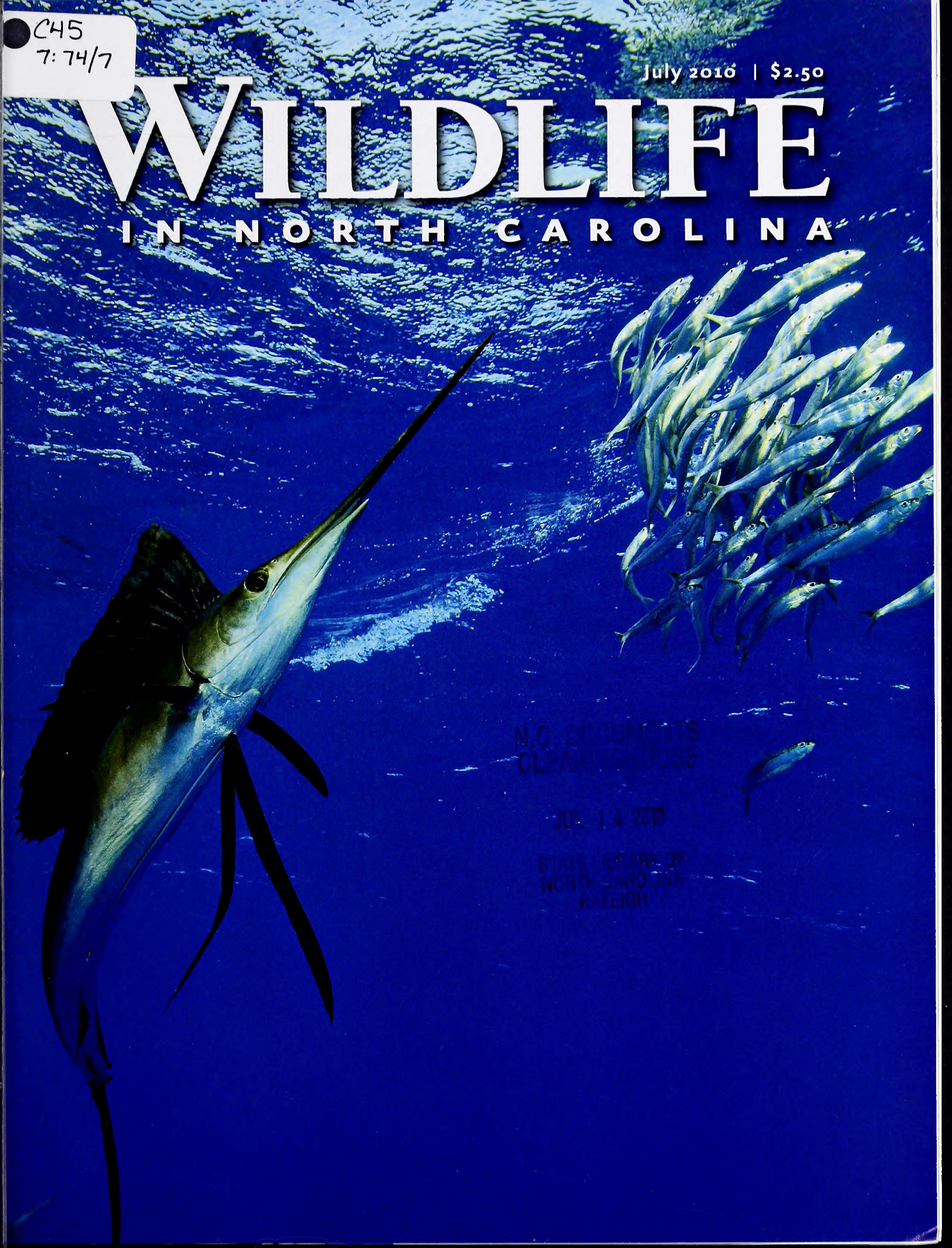
WILDLIFE IN NORTH CAROLINA



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A kayak with a depth finder and a homemade livewell? Absolutely, if you are going to fish for king mackerel off the North Carolina coast in one of these "saltwater sleighs."

PHOTOGRAPH BY HOWARD COUPLAND.

Volume 74 | Number 7

WILDLIFE IN NORTH CAROLINA

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Cover: An Atlantic sailfish corrals sardines for a meal. These amazing predatory billfish have been clocked leaping from the ocean at 68 miles per hour in pursuit of baitfish. PHOTOGRAPH BY BRANDON COLE.

Wildlife in North Carolina is the official educational publication of the North Carolina Wildlife Resources Commission. It is dedicated to the sound conservation of North Carolina's wildlife and other interrelated natural resources and also to the environment we share with them.

EDITOR'S NOTE

If you have read this magazine for a few years, you have probably noticed what types of stories run at certain times of year. In July, there are no hunting seasons open (except for crows), and the hot weather keeps wildlife from moving around much during the day, so many outdoors enthusiasts like to be in or on the water. For that reason, the July issue is usually full of articles about waterways, oceans and fishing.

MELISSA McGAW/NCWRC

This year is no exception. In this issue, we try to shed a little light on a couple of coastal fisheries—sailfish ranging in from the Gulf Stream to chase baitfish as close as 5 miles offshore ("Happy Sails," page 4) and the relatively new pursuit of inshore fishing for king mackerels in a kayak ("Kayaking for Kings," page 26). There are only a couple of similarities between the two types of fishing: both involve trolling, and once a fish is on, you are involved in a fight with a speedy, aggressive animal.

Some of the gear and techniques used for saltwater kayak fishing are applicable to freshwater fishing as well. Perhaps you could try a trip on the meandering Dan River. In the first of a two-part series on this river that we share with Virginia ("The Many Faces of the Dan River," page 20), Bruce Ingram discusses the conservation challenges and recreation opportunities the Dan holds. Beautiful scenery, great fishing and excellent crowd-free paddling are available there for anyone with a canoe and a paddle.

Finally, our lone terrestrial story highlights how a couple of Hoke County farmers took a washed-out old tobacco and cotton farm and converted it into a vibrant case study in sustainable and organic agriculture that is not only wildlife-friendly, but in many ways actually depends on wildlife for its success ("Reviving Raft Swamp Farms," page 10). Jackie and Louie Hough use their land as kind of a laboratory for local agriculture, teaching others their methods and even leasing land for novice farmers to give these techniques a try. The Houghs employ a number of plants that attract wildlife (such as the hawthorn pictured above, used to create hedgerows), and the birds come in flocks to eat insect pests that might otherwise damage the food crops.

Whether you enjoy freshwater or saltwater, or prefer working in the garden in July, the North Carolina outdoors awaits you. Take advantage.

Greg Jenkins

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WILDLIFE IN NORTH CAROLINA

JULY 2010 VOLUME 74, NUMBER 7

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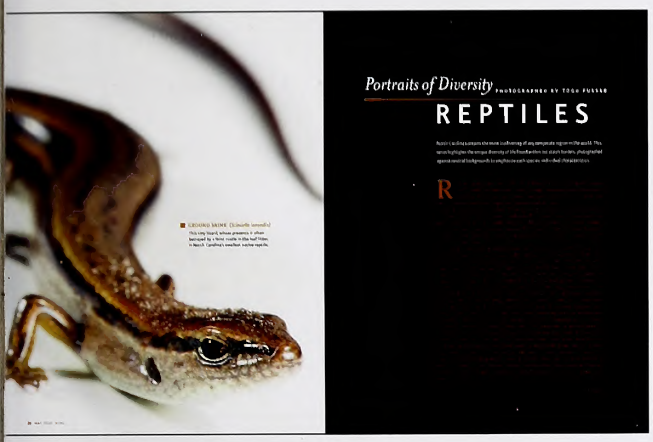


I.D. Deficiency

I'm a longtime fan of *Wildlife in North Carolina* and read every issue cover to cover. In other words, I truly like the magazine very much.

But one thing does bother me a little bit. As I look through a new issue, before I read it, many pictures (maybe even most), have no captions! Even after reading there still is no explanation or identification of the accompanying pictures.

For instance: In the April 2010 issue, just received, on pages 4 and 7; what kind of trout? The lower left corner of pg. 6; what is it? Pg. 7. Who is holding what kind of trout? The 4 or 5 fishermen are fishing where? What stream? I guess the pictures on 8 and 9 don't need any further comments but it would be nice to know where these guys are fishing. Pgs. 16 and 17. Somebody (Who? Maybe Jim Dean?) has his hand in the mouth of a — bass? The mouth doesn't look right. Pg. 18. Top picture. Is this spatterdock and an undesirable exotic plant? Which is which?

Good captions for Bruce Ingram's "Reel Healing." The Buntings: What is that bird top center? Left center? a juvenile Indigo? It doesn't say so. Bottom right? Cowbird? it doesn't say so. The deer; center picture pg. 38? Is it a Virginia deer? Is the deformed antler a typical effect of CWD? The only effect? The pictured deer isn't mentioned.

Nitpicking? Probably. And if I was a trained wildlife biologist, perhaps I would know the answers to all this and not need captions. I'm not. If I was, I might know what leucistic means. It was not in my dictionary but Google saved me! I'm 85—too old to go back to school.

I wonder if anyone else has come up with any comments about lack of captions?

Again, thanks for *Wildlife in North Carolina*. I truly do enjoy it. If being a little shy of captions is your worst problem, you're in super good shape!

John McAlister
Charlotte

***Greg Jenkins:** Your point is duly noted, John. We deal with so many species in each issue, sometimes we forget to identify all of them. Thanks for reminding us that not everyone spends as much time with this subject matter as we do. We owe you a bunch of IDs, so here goes: That's a native brook trout on page 4–5; the creature on the fishing reel on page 6 is a mayfly nymph (the aquatic stage before it develops wings); page 7 is another brook trout; the insect in page 9 is a mature mayfly; and the people are fishing in the Davidson River near Brevard. In this case, the photos had little to do with the specifics of the story, so we just wanted to show nice photos of people trout fishing.*

That's a largemouth bass on page 16–17, but it's a model grabbing it, not Jim Dean. The mouth might look strange because of the distortion inherent in underwater photography. The plant photo is only spatterdock, which is not an undesirable species. However, spatterdock lilies can sometimes contain aquatic invasive plants such as watershield, which is not controlled easily and can overwhelm a pond.

The bottom right bunting on page 33 is a female indigo. The female painted is on page 32 at the top right. The deer on page 38 is just a white-tailed buck with normal (but fairly sizable) antlers. Chronic wasting disease is not known to affect a deer's antler growth.

We will keep on working to publish the information you need in the magazine.

Cold-Blooded Praise

Well-deserved praise to Todd Pusser for his magnificent reptilian portrait gallery in the May issue ("Portraits of Diversity: Reptiles"). His images capture these creatures at their splendid best, and do more to promote awe and respect of our wild neighbors than words could ever effect.

Whenever I cross paths with one of these critters while wandering the fields and forests, streams and swamps of our state, I count it all joy and an honor to have made the acquaintance of yet another handsome member of our Tar Heel family.

Andrew Sleeth
Raleigh

I thoroughly enjoyed your article about diversity. I love reptiles, too. One of the cutest I have ever encountered is the Southern hognose snake. In my back yard in central Chatham County, west of the Haw River, I was challenged by this little devil, puffing itself up as if it were a cobra — hooded and flicking its tongue.

I have no photographic proof, but if my word is good enough, they are present well outside the southeastern Coastal Plain and the Sandhills.

Jack Brooks
Pittsboro

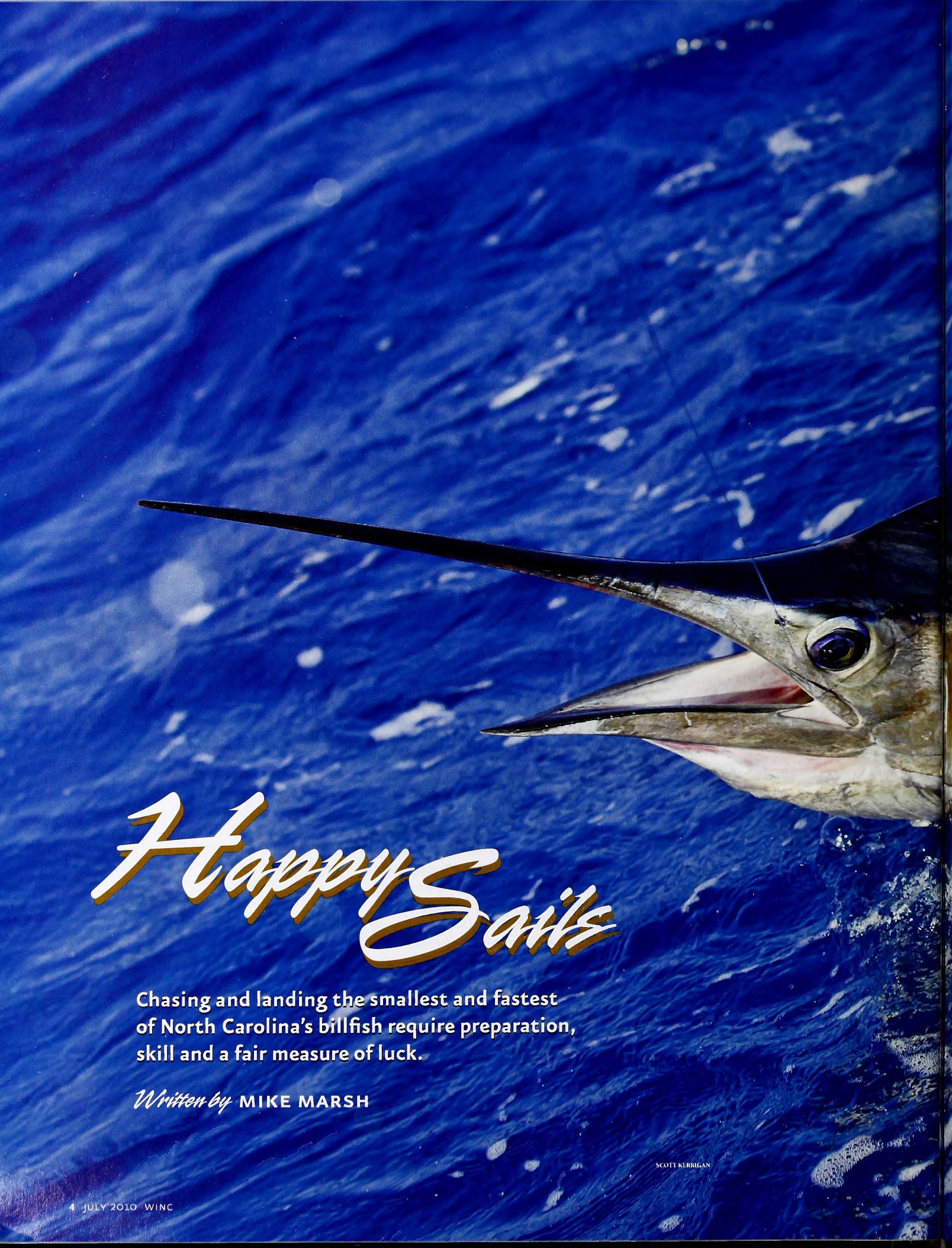
All Positive

Recently, I've noticed a lot of negative feedback regarding an apparent trend away from articles regarding hunting and fishing, to those focusing on natural history. I couldn't disagree more! The March issue illustrates this wonderfully. I was raised in a family that encouraged hunting and fishing, and as such, I enjoy doing both. However, I am also a homegrown naturalist of sorts and enjoy the articles about natural history as well. Throw in stories such as Mark Joyner's "Uncle Ivey and The Rabbit Gums" topped off with Mr. Dean's always excellent column, and the end result is a very fine magazine. Keep up the great work.

Robert O'Hern
Autryville

write us

Letters should be sent via e-mail to **letters@ncwildlife.org** *or through regular mail to Letters,* Wildlife in North Carolina *magazine, 1712 Mail Service Center, Raleigh, NC 27699-1712. Please include your name, address and daytime phone number. Letters chosen for publication may be edited for clarity and length.*

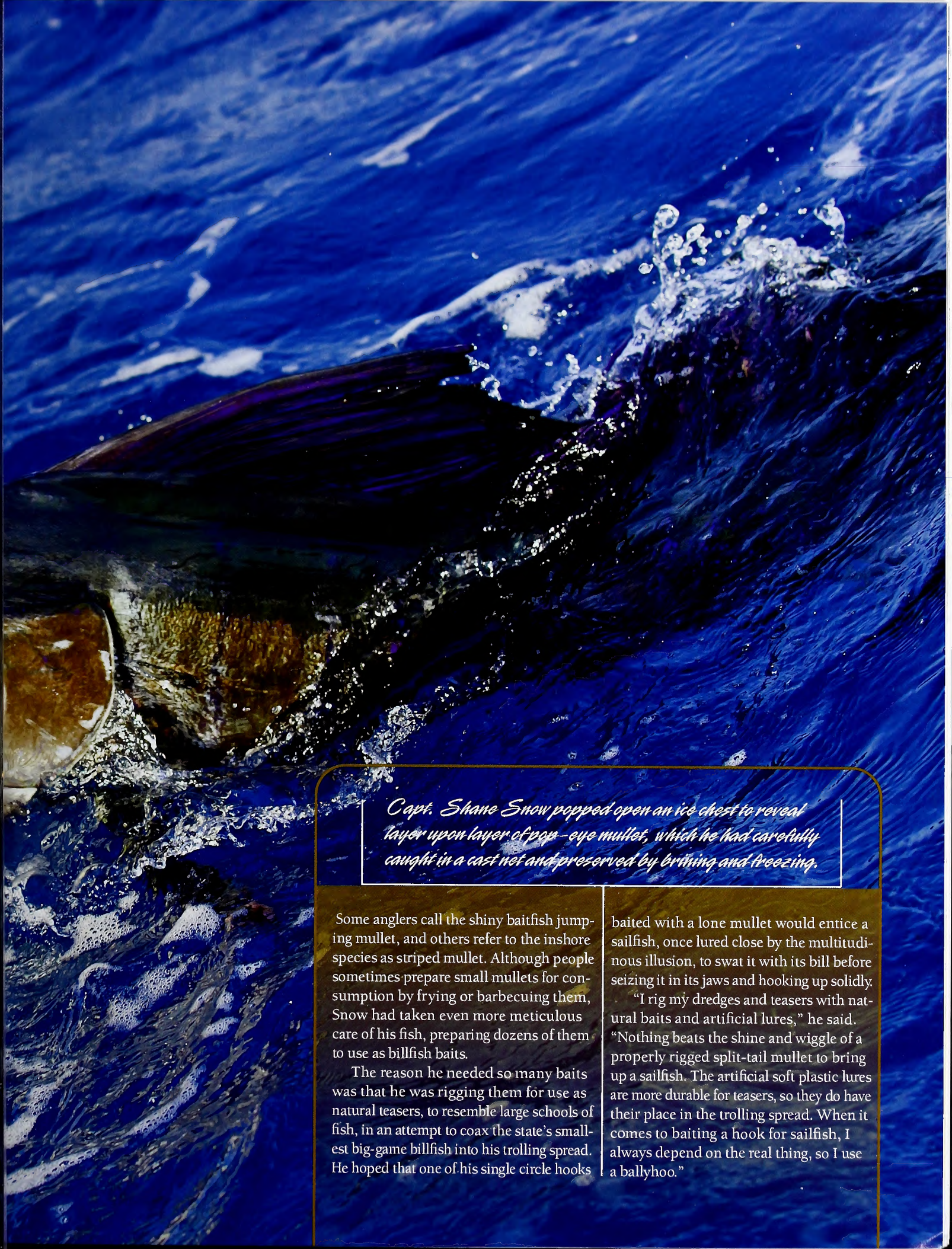


Happy Sails

Chasing and landing the smallest and fastest of North Carolina's billfish require preparation, skill and a fair measure of luck.

Written by MIKE MARSH

SCOTT KERRIGAN

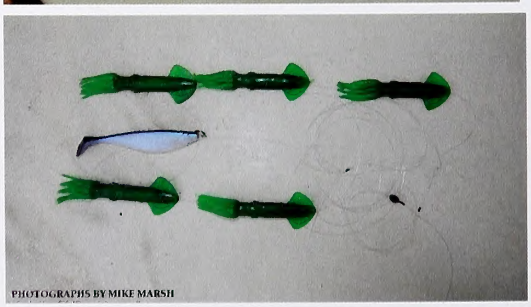


Capt. Shane Snow popped open an ice chest to reveal layer upon layer of pop-eye mullet, which he had carefully caught in a cast net and preserved by brining and freezing.

Some anglers call the shiny baitfish jumping mullet, and others refer to the inshore species as striped mullet. Although people sometimes prepare small mullets for consumption by frying or barbecuing them, Snow had taken even more meticulous care of his fish, preparing dozens of them to use as billfish baits.

The reason he needed so many baits was that he was rigging them for use as natural teasers, to resemble large schools of fish, in an attempt to coax the state's smallest big-game billfish into his trolling spread. He hoped that one of his single circle hooks baited with a lone mullet would entice a sailfish, once lured close by the multitudinous illusion, to swat it with its bill before seizing it in its jaws and hooking up solidly.

"I rig my dredges and teasers with natural baits and artificial lures," he said. "Nothing beats the shine and wiggle of a properly rigged split-tail mullet to bring up a sailfish. The artificial soft plastic lures are more durable for teasers, so they do have their place in the trolling spread. When it comes to baiting a hook for sailfish, I always depend on the real thing, so I use a ballyhoo."



PHOTOGRAPHS BY MIKE MARSH

Snow was fishing aboard his 31-foot JC sportfishing boat *S.S. Fish Witch*. The family business, Fish Witch Charters, is operated out of the Carolina Beach municipal docks. Other boats in the Fish Witch fleet include the 48-foot Henriques *Fish Witch II* for Gulf Stream fishing, which is captained by Shane's father, Carl Snow Jr., and a 24-foot Carolina skiff, *Little Witch*, which is used for inshore and nearshore fishing. From these three sleek watercraft, Shane said, he can catch any fish that swims. But of all the fish in the Atlantic Ocean offshore along the North Carolina coast, he prefers fishing for sailfish.

"I like catching sailfish because they are fairly easy to find but are very hard to catch," he said. "Most people who catch a sailfish hook it by accident when they are fishing for some other species. But you have to really know what you're doing to catch them consistently. It's a real challenge to hook one, play it all the way to the boat and release it. If you're lucky, you might get to fight about half the sailfish you hook all the way to the boat. The rest of them are going to put on quite a show for everyone onboard before they jump off after throwing the hook."

Sailfish are available to anyone who has a boat that is seaworthy enough to navigate safely through one of the coastline's many inlets. Though hooking a sailfish from an ocean pier is a rare occurrence, the fish do move very close to shore when conditions are to their liking. King mackerel fishermen encounter them as the water grows hot at the peak of summer and land one on occasion. News of a king mackerel angler catching a sailfish is always big news around the docks and tackle shops. But the standard king mackerel rig, consisting of a couple of No. 4 treble hooks on a light wire leader holding a live menhaden bait, is not the best bet for holding a sailfish securely. A lightweight king mackerel trolling rod and reel also may not be the best choice in gear for subduing a leaping sailfish. A lot more king mackerel anglers see their sailfish jump free than ever get to grab the leader to claim a landed fish.

"By July, the sailfish are working big pods of baitfish within 5 to 20 miles of the beach," Shane said. "I've seen them so concentrated as many as 10 sailfish are on top, chasing baitfish ... You can see their sails flaring and their bills poking out of the water. All you have to do is find some pretty blue water and a big pod of bait, and sailfish are likely to be there."

This particular sailfish expedition was about more than catching a sailfish. Shane, his fiancée Laura Wells and his lifelong friend Travis Koontz were trying to win the Ninth Annual Capt. Eddy Haneman Sailfish Tournament (see sidebar, page 9). They had fished the first day of the two-day contest without success. But with a bit more knowledge, the trio was hoping for a bite on the final day of the tournament.

"Sailfish don't necessarily school in the same spots from year to year," Shane said. "They move around a lot, following baitfish. Structure is never the key piece of the puzzle to finding sailfish, as it is with most other fish."

A few boats competing in the tournament had found one of the tightly balled baitfish-billfish melees about 24 miles offshore in the vicinity of WR4, which marks the site of the wreck of the 8,000-ton tanker *John D. Gill*. They had boated a few sailfish, and the word had gone out. By the time *S.S. Fish Witch* arrived at the scene, a couple of dozen other boats were already fishing there.

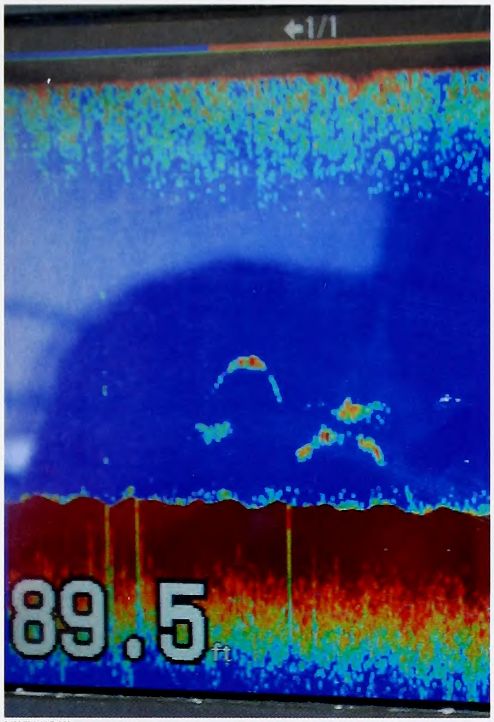
"The best places to look for sailfish along the state's southeastern coast are the Dredge Wreck, the 23-Mile Rock, Schoolhouse ledges and locations between," Shane said. "But this school produced most of the fish caught yesterday, so that's why we're here today."

Shane circled the area, watching the other boats that were already fishing for signs of hookups—anglers straining against fishing rods in the cockpits, and sailfish leaping at the ends of long lines. He also watched his depth finder screen for telltale signs of predatory fish. Suddenly, he pointed to arch-shaped images amid the smaller dots that represented clouds of ballyhoo, cigar minnows, sardines or flying fish. "Those big return echoes are sailfish," he said. "That's what we came here for, so it's time to get busy. We need lines in the water!"

Travis and Laura helped Shane rig the fishing rods with baits and leaders and set the lines from outriggers and transom rod holders. They manned the rods and piloted the boat, watching out for other boats and fishing lines, while Shane finished rigging two dredges as teasers and set another daisy chain of five green rubber squid trailed by a large soft plastic lure resembling a baitfish.

The dredges were rigged with two tiers of baits and lures. Wire spreaders opened to show the baits and lures in three dimensions, imitating a naturally swimming school of

Capt. Shane Snow (opposite page, top and middle) rigs a dredge-style teaser consisting of artificial lures and natural baits, in this case split-tail mullets. Plastic squid also are used in a teaser. Large images on the depth-finder (right) indicate possible sailfish. The teaser, (far right) is deployed and with any luck, a fortunate angler will hook up with a sailfish.



MIKE MARSH

MIKE MARSH

baitfish. Each dredge had two rows of attractors. The lead row on one dredge consisted of 12 large paddle-tail soft plastic lures, and the second row consisted of mullet rigged by splitting the tails to remove the backbone. Removing the backbone allowed the mullet to undulate with a natural swimming motion. The other dredge held two tiers of split-tail mullet. The dredges were deployed by cranking them out on downrigger reels, with the lines holding the dredges run through pulleys tied to the outriggers. The daisy chain went overboard, trailing along on a line through the center outrigger ring.

When looked at from below, in a sailfish's-eye view, the spread became a trap. Six fishing lines baited with circle hooks holding ballyhoo baits were set in pairs from the outriggers at distances of 50 feet, 40 feet and 30 feet behind the boat. The longest lines were set on the outside of the spread, with progressively shorter lines at the inside, forming a V shape. The squid daisy chain trailed near the center of the V about 40 feet from the transom, and the dredges were dancing along on the wake kicked up by the diesel engine's propeller right behind the boat.

"I want my trolling spreads to look so much like a school of baitfish that a sailfish can't resist coming up for a look," Shane said. "It's after you see a sailfish show itself that the excitement begins."

Snow said his trolling spread was deployed the same way it would be for the other, larger billfish of the area—blue marlin and white marlin. But the rods and reels, lures and baits he used for catching sailfish were smaller than they would have been for blue marlin. He used 20-pound-class tackle rather than the 80- or 130-class tackle he would have used for landing larger billfish. He was using 7-foot Key Largo live-bait rods mated to Shimano TLD 20 two-speed reels with their fighting drags set at 6 pounds and spooled with 40-pound test high-visibility monofilament fishing line. A 6-foot, 50-pound monofilament

If you're lucky, you might get to fight about half the sailfish you hook all the way to the boat. The rest of them are going to put on quite a show for everyone onboard before they jump off after throwing the hook.

SCOTT KERRIGAN

MIKE MARSH

MIKE MARSH

SCOTT KERRIGAN

Laura Wells (far left) lets out a bait and then hooks up with a sailfish. The fish is revived prior to release by holding it beside the moving boat and letting water flow over its gills. Sailfish attack (far right) balls of baitfish, in this case sardines, by slashing at the fish with their bills, then eating the stunned or wounded fish.

leader was tied between the hook and the line. But aside from the actual baiting and setting of the lines and teasers, Shane said there was another "catch" to successfully fishing a sailfish spread.

"With other billfish, you're just trolling along, hoping to pull the baits past a hungry fish and he will strike," he said. "But with sailfish, you have to actively fish your line to catch them. The dredges and teasers and all those fishing lines in the water will attract the sailfish to your spread sooner or later. But you're still going to have to grab a rod and feed the bait to the fish. You're not going to catch a sailfish unless you're holding the rod and dropping the bait back to him to make him strike."

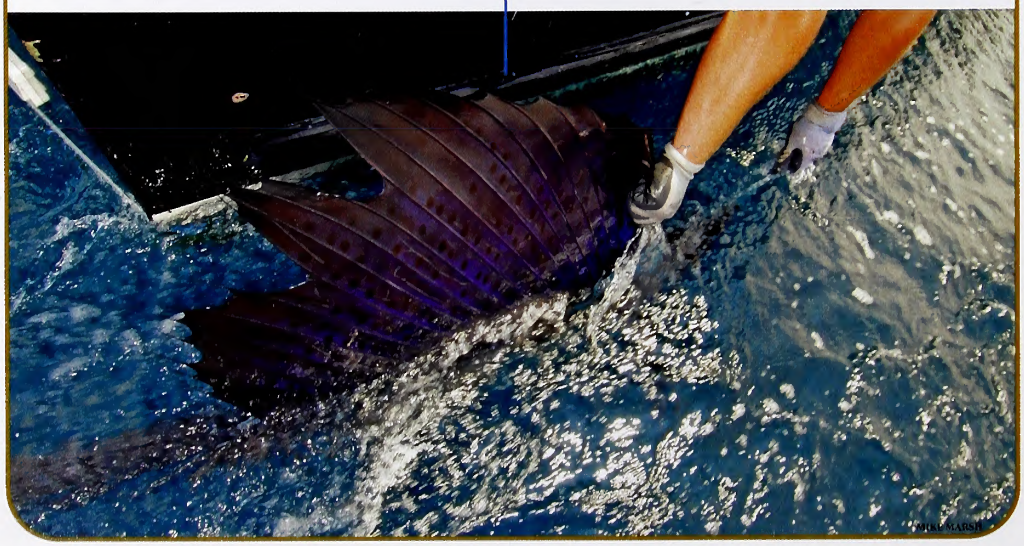
Other captains were filling in tournament anglers about their adventures via the VHF airwaves. Their voices scratched out reports of sailfish hookups, landings and "early releases," which means the fish jumped off before the mates' hands could touch the leaders. A dolphin strike perked up everyone aboard *S.S. Fish Witch* for a moment before the small fish leaped and showed off its emerald green iridescence in the sunlight.

Travis reeled in the dolphin. Then he set out another mullet bait he had already rigged on a different rod to save the time it would have taken to re-bait the line the dolphin had struck.

"Catching a sailfish takes a little bit of luck, a little bit of skill and a lot of being in the right place at the right time," Travis said. "Sooner or later, if you put in your time, a sailfish strike is going to happen."

Shane kept up his crew's spirits as they cleared sargassum — a floating seaweed that creates offshore fishing structure and serves as the basis of a food chain that attracts billfish and dolphin — from their fishing lines for the umpteenth time, telling them there were plenty of baitfish and the water temperature was perfect. He pointed out flying fish and glass minnows, which represented

As water jetted through the fish's gills, it regained its strength. After a few minutes, the fish was so strong it could no longer be restrained. Shane let go of the tail first, then the bill, and the fish returned to its home.



sailfish food, and the 88.5-degree water temperature on his sonar display. He was explaining how sailfish prefer hot water when a sailfish suddenly showed.

"There he is!" Shane shouted. "Grab a rod!" But Shane himself beat everyone else to the rod. He picked it up as the sailfish followed a dredge, batting one of the unresponsive baitfish with its bill. Shane free-spooled the line to the spot where the fish had showed its bill, then flipped a lever to disengage the reel's gears to allow the bait to drop back freely to the fish.

Dropping back the bait incites the natural feeding instincts of a sailfish. The bill is extremely hard and is used as a weapon to stun or kill baitfish as the sailfish corrals a school by displaying its sail and pectoral fins in a tactic that can be described as almost herding. Several sailfish feeding in this manner can ball a school of baitfish very tightly. The sail and long body of a sailfish provide an extremely high degree of leverage for slashing the bill back and forth through a baitfish school like a cavalryman's saber. Injured baitfish fall freely, perhaps wriggling slightly as they struggle to stay up in the water column. That's when a sailfish seizes the opportunity to feed.

As Shane dropped back the ballyhoo, the sailfish struck. The circle hook imbedded in the corner of its mouth and startled the fish. It did what most sailfish do when struck—it leaped completely free of the previously serene water's surface.

Laura took the rod, and Shane helped her into a fight belt that clamped around her hips. She fought the fish expertly, reeling to gain line whenever the fish allowed her to do so. The fish cleared the water seven times, then "greyhounded" across the surface a dozen more times. After a 20-minute battle, Shane grabbed the leader, and Travis snapped some photos to document the landing before announcing over the VHF radio that the fish had been caught.

"Now we have to revive the fish," Shane said. "We can't release the fish until it can swim away on its own." Travis navigated the boat away from the tournament fleet as Shane held the sailfish, pointed bill-first in the direction the boat was moving. As water jetted through the fish's gills, it regained its strength. After a few minutes, the fish was so strong it could no longer be restrained. Shane let go of the tail first, then the bill, and the fish returned to its home.

"It's only my second sailfish," Laura said. "I caught my first one in last year's Capt. Eddy Haneman tournament. I've caught so many different fish with Shane, and I love being out here fishing with him. The ocean is beautiful, and so are the fish."

But her second sailfish did not win any prizes. Although it was caught the final afternoon, other fish were released afterward, and other boats caught and released multiple sailfish over the two days of fishing. But the fish did win over a couple of hearts.

During the outing, Laura had spoken of wedding plans. Shane smiled when she asked whether he thought catching her second sailfish was enough to seal their nuptial deal and set a date. It wasn't long afterward that the happy announcement of their wedding was made, and a few months later the couple married. Any couple that has the endurance to fish for, and successfully land, sailfish together is certainly dedicated enough for their marriage to endure. Wedding well-wishers were highly hopeful that the deep blue waters of the Atlantic Ocean would bestow many more "happy sails" on the Snows. ◆

Wilmington writer Mike Marsh is a frequent contributor to Wildlife in North Carolina.

NATURE'S WAYS

How Do Sailfish Capture Prey? See Nature's Ways, page 39.

THE CAPT. EDDY HANEMAN SAILFISH TOURNAMENT

The Capt. Eddy Haneman Sailfish Tournament takes place July 30–Aug. 1 at the Bridge Tender Marina at Wrightsville Beach. Proceeds benefit the Hospice Foundation for Education of Children with Down Syndrome.

Capt. Haneman was one of the first charter captains in Wrightsville Beach, where he began taking anglers fishing starting in 1946. He died in 1994 and was a much respected charter captain.

To honor his memory, the catch-and-release tournament celebrates the arrival of sailfish in large numbers to local waters. For a sailfish to qualify for a cash prize, a photograph of the fish must be taken, clearly showing the leader in an angler's hands, before the fish is released. Various release categories are awarded cash prizes, including the first and last release of the day and the largest number of releases for the two-day tournament.

For more information, visit www.gottaflyguideservice.com or call the Bridge Tender Marina at (910) 256-6550.

For more information about Fish Witch Charters, visit online at www.fishwitch.com or call (910) 458-5855.

BRANDON COLE

Reviving Raft Swamp Farms

An energetic, dedicated couple has transformed a once-dormant cotton and tobacco operation into a wildlife-rich sustainable teaching farm.

Written by Sidney Cruze Photographed by Melissa McGaw

The skies over Raft Swamp Farms are bustling with birds. Purple martins swoop through the air catching flies and mosquitoes; Mississippi kites glide above the trees and chimney swifts hurtle past like flying cigars. Last spring, a flock of 200 bobolinks spent a week crisscrossing the fields before heading north to breed.

Altogether more than 70 species have been seen on the Hoke County farm, and their presence is no coincidence. Owners Jackie and Louie Hough have made efforts to attract the birds as part of their plan to create a thriving small-scale sustainable farm in the Sandhills.

Farmers in North Carolina manage 8.8 million acres of land, and many engage in best management practices that preserve habitat for bobwhite quail, wild turkeys, migratory birds and more. The Houghs understand that wildlife conservation can benefit people as well. By forging a mutually beneficial relationship between animals and agriculture, they transformed their once-barren fields into a vibrant, productive landscape. Raft Swamp Farms is now an organic farm incubator associated with the Carolina Farm Stewardship Association. Fittingly, it is also a site on the Piedmont Birding Trail. Open for tours by appointment, it offers visitors a glimpse of how organic farming enhances habitat for birds and other wildlife.

Environmental stewardship

Raft Swamp Farms stretches across 150 acres just south of Raeford. Bordered to the west by the eponymous Raft Swamp Creek, its fields were once farmed conventionally to produce tobacco and high-yield cotton.

The Houghs bought the land in June 2005. A former sergeant major in the U.S. Army's Special Forces, Louie spent his first 19 years on a 40-acre farm in Indiana. Jackie grew up in a small Wisconsin farm town, fishing the area lakes and rivers with her father. She served in the Army Nurse Corps before taking her job as a neonatal intensive care nurse at Cape Fear Valley Medical Center. Both were looking to return to their rural roots..

RAFT
SWAMP
FARMS

Conservation practices at Raft Swamp Farms such as no-till farming (Louie Hough using his grain drill, top right) have paid off with the presence of a diverse suite of wildlife. Clockwise from middle right: Austrian field peas provide a cover crop and food for wildlife; farm-grown gourds become homes for purple martins; the farm is home to beneficial insects small and smaller; bobwhite quail live in the hedgerows, where chicks feast on insects; and the farm relies on valuable pollinators such as honey bees.

The Houghs' childhood experiences instilled in them an appreciation for the natural world that spurred their interest in sustainable farming, in which crops are grown in harmony with nature. They began watching North Carolina wildlife after moving from Germany to Fayetteville—their last duty station—in 1989. A few years later Jackie began working part-time at a native plant nursery to learn about plants indigenous to the Southeast. Soon they were looking for land of their own, a place they could put their new knowledge and environmental ethics to work.

When Jackie and Louie bought Raft Swamp Farms, it was an expanse of dirt and stubble. Years of pesticide use and clean farming, which eliminates fallow fields and grassy areas, had killed the native weeds and grasses, destroying the habitat for small mammals, songbirds and Northern bobwhite quail. "We knew we could manage our farm to produce crops efficiently and appeal to wildlife," Jackie says. "We'd seen it work growing up."

Today the farm pulses with life. Bees buzz in and out of blueberries, anoles skitter up tree trunks and quail raise their chicks in the fields. The farm produces honey and an array of organic herbs and vegetables that they sell at area farmers' markets.

Common-sense farming

On the farm Jackie walks alongside the fields, calling out scientific names for the native plants and trees we pass. The tulip poplars provide early bee forage; the persimmons offer blossoms to the bees and a delicious late-season crop of fruit; native plums and wild muscadines feed songbirds and small mammals. Everything has a purpose.

Some of the trees were here when the Houghs bought the land, but they've planted hundreds more trees and shrubs native to the Southeast—and begun the slow, arduous task of eradicating invasive exotic species that gained a foothold during decades of neglect. After careful planning and planting, the natives include pawpaw, pecan, Atlantic white cedar, red chokeberry, beautyberry, climbing asters, native hollies and oaks.

"The difference we've seen in the wildlife is striking," Jackie says. "We've had a resurgence in birds, rabbits, quail; even the squirrels are back." Like many farmers, the Houghs rely on pollinators to get the most from their fields. With that in mind, they have planted blueberries, blackberries, goldenrod, sourwood and muscadine grapes—all magnets for valuable native pollinators and honeybees.

As we walk, Jackie stops in front of a red mulberry tree surrounded by a thicket of green. "This tree was nearly lost in the overgrowth of vines. When we cut the vines back, we discovered the mulberry underneath. Louie was happy, because he loves the taste of mulberries."

He's not alone. When the mulberry begins fruiting, the Houghs notice an increase in animal tracks nearby. Wild turkeys, skunks, foxes and raccoons eat the juicy berries, as do the vireos and warblers that migrate through the farm. Because the mulberry provides food for small mammals, game birds and songbirds—not to mention Louie—as well as forage for bees, it fits well with the Houghs' plan to create an environment that sustains wildlife and farming.

"By planting things that serve multiple functions, we have developed a coordinated system," Jackie says. "Our crabapple trees are a good example. They provide shade, serve as windbreaks and help reduce soil erosion. Plus their fruit feeds the small mammals we have on the farm."

The birds at Raft Swamp Farms are an integral part of this system. Because the Houghs use organic methods, they strive to improve the soil by planting cover crops such as Austrian field peas and crimson clover, adding valuable nitrogen and organic matter to the soil while creating habitat for insects. "Those bobolinks stayed as long as they did because our field peas harbored insect larvae they could feed on," Jackie says.

For the bobolinks, Raft Swamp Farms is a place to refuel as they travel to their summer home in the Northeast. Since the Houghs don't use pesticides on their fields, they can rely on the birds to provide chemical-free insect control.

The bobolinks' visit was serendipitous, but the Houghs have worked hard to attract other species. Vines of birdhouse gourds yield large fruits that are dried to make homes for purple martins. Louie built nesting boxes for purple martins and bluebirds, as well as perching sites for loggerhead shrikes and other raptors. They also applied for and received a grant from Wildlife Rehabilitators of North Carolina Inc. to build and maintain a chimney swift tower. Now chimney swifts scour the sky for insects from May to September.

Valuable cover crops

Five years after purchasing the land, the Houghs continue to add elements to their sustainable whole-farm system. Their plans include the addition of a pond, and work is currently under way to convert four pastures to native warm-season grasses and forbs to support rotational grazing of poultry and goats. Seeds for native grasses and wildflowers are now available at the farm.

Today the farm yields asparagus, strawberries, early peas, green beans, blueberries, tomatoes, peppers, watermelons, cantaloupes, sweet potatoes and more. The Houghs are committed to sharing what they know and regularly seek opportunities to expand their knowledge of whole-farm systems. They try new vegetable and fruit

Clockwise from top left: Crimson clover is a cover crop that attracts wildlife; black rat snakes feed on the farm's small mammals; wild plum trees make up part of the hedgerow system; Jackie and Louie in front of their popular mulberry tree; Jackie in a patch of lavender; one of the flock of bobolinks that migrates through the farm, providing insect control for the crops; and a purple martin nesting in a gourd.

varieties each year, have a growing sustainable farming library and are frequent attendees at the state's many sustainable agriculture workshops and conferences.

Anyone interested in organic farming can lease a small tract of land on the farm. Once growers commit, they have access to the Houghs' hands-on training, facilities and equipment. Farmers must buy their own seeds, and plants can be started in one of two greenhouses. The Houghs have a windmill-powered pump for irrigation, plus a disc, a tractor, a cultivator and a grain drill.

The 5-foot-wide grain drill—a Sukup food plot planter—is key to the Houghs' ability to create a sustainable operation because it allows them to practice no-till cropping, a conservation tillage method that benefits both farmers and wildlife. When Louie plants a new crop, he pulls the grain drill behind the tractor, where it opens a narrow furrow in the dirt, places a seed in the furrow, and then covers it back up, creating only a thin line of disturbed earth. Instead of getting uprooted by a plow, the cover crops stay on the fields, where they reduce soil erosion, help retain moisture, make nitrogen accessible to plants and create shelter for rabbits and quail.

"The cover crops also attract food for wildlife," says David Williams from the N.C. Department of Environment and Natural Resources' Division of Soil and Water Conservation. "Insects live in the cover crops, birds take advantage of the insects and larger animals rely on the birds for food. These cover crops create the ground-floor support for an entire food web."

No-till farming is especially beneficial to bobwhite quail. During the first two weeks of life, bobwhite chicks need large amounts of protein, which they get from eating insects. An N.C. State University study shows the chicks get the protein they need in only four hours on a no-till field, but can't eat enough in a day on conventionally tilled fields.

Living fences

Raft Swamp Farms is organized into 3-acre fields divided by hedgerows. At 6 to 8 feet wide, these hedgerows create travel corridors and habitat for rabbits, opossums, raccoons and other small mammals. They also provide cover for bobwhite quail.

"Lots of variables affect bobwhite quail, but providing them with habitat is the key," says Wes Coltrane, regional director for Quail Unlimited, a conservation organization dedicated to restoring America's wild quail populations. "On a farm, if you can have smaller fields with buffers between them, that's ideal."

The Houghs designed their hedgerows to feed a variety of wildlife, planting them with a mix of natives such as crabapple, wild plum and flowering dogwood. One small thorny tree, the hawthorn, makes an ideal plant for these hedgerows. A member of the rose family with 38 species native to North Carolina, the fast-growing hawthorn produces fruit that lasts through the winter. These orange-red pomes feed the migratory warblers in both the fall and the spring. The hawthorn limbs also create living fences where robins, sparrows and wrens can rely on the plant's formidable 3-inch thorns to protect nests from raccoons and other predators. Plus, the richly scented white flowers attract bees in the spring. "They provide flowers, fruit and structure, and their limb pattern makes them as beautiful as old apple trees," Jackie says.

On the farm's mile-long western border, Raft Swamp Creek also creates a wildlife corridor for larger animals. The creek starts northwest of Raeford and meanders through miles of blackwater swamp before it meets the Lumber River in Robeson County. Coyotes, black bears, beavers and white-tailed deer travel this natural highway through Hoke County. The Houghs have committed to keeping a 300-foot wooded buffer along the creek to protect its water quality. Flycatchers, waterfowl, woodpeckers and warblers thrive in this wet forest, where bald cypress, water tupelo and swamp black gum trees dominate the canopy.

Natural rhythms

Louie works full-time on the farm. Jackie spends as much time there as she can away from her nursing work in town and keeps careful records of the rhythms of the natural year.

"The martins are here by St. Patrick's Day, then gone near the first of September. By mid-April we hear the warblers," Jackie says. "The wildlife patterns we see are related to how things grow. We notice more travel from the animals when plants begin blooming and producing food."

The Houghs welcome visitors, volunteers and new farmers to Raft Swamp Farms. Almost 4 miles of trails meander along the perimeter, making it an ideal spot for hiking or bird watching. Steve Patterson, former president of the Carolina Bird Club, calls Raft Swamp Farms a special place, one where you can witness the ways plants benefit both each other and the animals living on the land.

"The Houghs have done an excellent job of managing their land for birds and other wildlife, and I was very impressed with their innovative, common-sense approach to farming," Patterson says. "In 2007 they counted 68 bird species. I wouldn't be surprised to see that number reach 200." ◆

Sidney Cruze is a freelance writer living in Durham and an occasional contributor to Wildlife in North Carolina. *Visit www.raftswampfarms.org for information on how to arrange a visit.*

CATAWBA CAT'AST'ROPHE

Written by Jeremy Grady Illustrated by Gary Palmer

A FISHING TRIP ON FAMILIAR WATER TAKES A DANGEROUS TURN, AND A PAIR OF BROTHERS LEARNS **A VALUABLE LESSON ABOUT TAILRACE FLOAT TRIPS.**

Every summer, with either my brother or a friend, I would float and fish the Catawba River tailrace below Lake James in a canoe. Floating the river offered access to a lot of water that we couldn't get to otherwise. If the river had one or two generators operating, it presented some different fishing opportunities. The bigger fish would set up in different areas to feed, and with spinning tackle we could get to them.

This was always a fun fishing trip in the middle of the summer, when we might catch brown trout, rainbow trout, largemouth bass, smallmouth bass or striped bass. On hot July days, the air was cooler on that river. Also, canoeing with only one generator operating created some white water in places, which would splash up on us as we floated through and felt pretty good in the heat.

ALL I COULD THINK WAS, ***Jason, please don't drown!*** BY NOW WE WERE BOTH SUBMERGED, WITH THE EXCEPTION OF OUR HEADS.

We had floated this river for years without incident, and I guess with such luck an angler can get a little cocky or careless. On this day, my fishing partner was my brother, Jason, who is seven years younger than me. We've had our share of close calls over the years hunting and fishing. Normally, if we caught a couple of fish while floating through a nice run, we would simply paddle back up the side of it and float through it again. This time I was going to use an anchor, and planned on dropping it in those big runs and dragging it behind to slow the canoe so we could fish more thoroughly.

We had borrowed a 15-foot aluminum Grumman canoe, two paddles and a custom bow seat from a friend. We didn't put on life jackets; they were buckled to the seats and made for good cushions. I was seated in the stern, and Jason sat in the bow. We launched about 10 a.m. from private property that was about 200 yards below where Muddy Creek empties into the Catawba River. Our take-out point was the Watermill Bridge access. I really don't know the actual miles floating, but when there aren't any generators operating, it's about a one-hour float and fish. With one generator, it's about five hours. On this day, the river was generating two units, and the water was clear. Sometimes it's dingy because of Muddy Creek, but I always like fishing in clearer water.

In addition to bringing spinning tackle, we strung up two fly rods. Sometimes the generators would stop during a float trip, and this created good opportunities for fly-fishing while wading.

The first run yielded a nice 12-inch brown trout that attacked my plug. We didn't get any more strikes, so we proceeded to the next run. I thought this would be a good time to test the anchor, so I pitched it out. I could feel the anchor crawling along the rocks. The water was about 5 feet deep, not completely white but moving fairly swiftly. Jason cast while I maneuvered the boat. The anchor stopped suddenly, and so did the canoe. When it stopped, the canoe turned to the left and tilted to one side just enough to allow some water to enter the boat. When I saw this, I immediately leaned to the right to try to balance the canoe. I guess the weight distribution in the boat dislodged the anchor, because the boat popped up straight and we continued floating. Right then, I should have made a mental note: *Do not throw the anchor out in swift water*—but I didn't. I just ignored it. We had fish to catch; conditions were good, and that's all that mattered.

The next run lay below the powerhouse road bridge. The rocks on the bottom were much smaller, the river was slower and the anchor didn't hang up. Jason hooked a good fish but never saw it. The fish stayed down and pulled drag off the spinning reel and got away. Knowing that the next run was a good place, I figured we might get into some fish and drop the anchor there as well.

This run was moving fairly swiftly, with a fair amount of white water showing. As soon as we started into it, I dropped the anchor. I could feel it crawling along the rocks on the bottom. And just like the first time, the anchor locked up. The boat turned to the left and tilted. I yelled, "Lean to the right!" We both leaned to the right, but that wasn't enough. The boat continued to tilt, and that cold Catawba River water began to rush in. Within seconds the canoe was pulled down into the water. You know the feeling you get when you first dive into a swimming pool and it takes your breath away? Both of us were making those sounds, and when I heard my brother breathing like that, it scared me. All I could think was, *Jason, please don't drown!* By now we were both submerged, with the exception of our heads. While the canoe was going down, I snapped the two expensive fly rods, in addition to trying to grab whatever was not tied to the boat, including my fishing tackle bag that held hundreds of dollars worth of flies and lures. I lunged and missed, then watched it float on down the river.

I was relieved to see that Jason's head was above water. By now, somehow we were both out of the canoe, hanging onto it, drifting along with the river; I guess the anchor had pulled loose. For several seconds neither of us could touch bottom. Finally we did, and we began to walk the boat to the edge of the river. This alone was a major blessing, because there are a lot of rocky banks on this river, and this could have happened at any one of them. Instead, we were able to pull the boat out on a sandbar.

We both stood there in shock for several minutes. We were very lucky that neither of us drowned or broke a limb. As our nerves calmed, we began to evaluate what we'd lost and ruined. Immediately, we realized both paddles were missing, both fly rods snapped, my fishing tackle bag gone, the custom front seat missing and an expensive camera ruined. With no paddles, what were we going to do?

Guessing we were about a mile from the powerhouse road, we thought about walking. But the entire distance was covered in a pine thicket that we couldn't walk through ourselves, much less drag a canoe through. So we weighed our options. Jason said, "What if we floated the river on down to the take-out point?" I replied, "We don't have any paddles. How do you think we'll do that?" Then Jason suggested, "What if we cut a couple of push poles out of sapling trees

and just push along as the river carries us?" I agreed with the idea, saying, "I don't think we have much choice."

We dug around in a "boat bag" that was fastened to one of the thwarts. (I can't believe I had enough sense to attach this, but I did.) In this bag I carry way too much stuff. There was a first-aid kit, a camera, a map, a multitool, and a few odds and ends. The multitool, a Christmas gift from my mom, had a saw that made quick work of two 6-foot-long saplings.

Now we were ready to try again. We emptied out all the water, put the broken fly rods in the bottom of the boat, got our push poles ready and shoved off. Neither spinning rod was broken, and the only lure or fly I had left was a No. 5 Shad Rap that was tied on the end of my line. Jason didn't lose his fishing bag—he was smart enough to attach it to the front seat of the boat. As we began to float, I noticed there were some very nice-looking places to fish. I thought, *Why not fish? We're here, conditions are good and we're going to be here for a while; it won't hurt to throw this plug some.* On the third cast, I felt something stop the lure, and a nice brown trout cleared the water. When he reached the canoe, he measured 15 inches.

As I poled us along, we continued to fish. The push poles did surprisingly well. In the bends of the river, we were able to push off rocks. I hadn't realized that we could drag the poles on the bottom of the river (where it was shallow enough) and steer the boat. They also worked very well at slowing the boat, and the poles weren't going to hang up like the anchor. About a mile farther downriver, we spotted one of our paddles hanging in a tree. We retrieved it, which took some careful maneuvering with the push poles and some teamwork. We also discovered that even one paddle made a huge difference in steering the canoe.

As we floated, we continued to cast our lures, and the brown trout continued to cooperate. Surprisingly, I didn't lose my last plug. Needless to say, I did not throw out the anchor anymore. If the fishing was good in a particular run, we just paddled back up the side like we used to do.

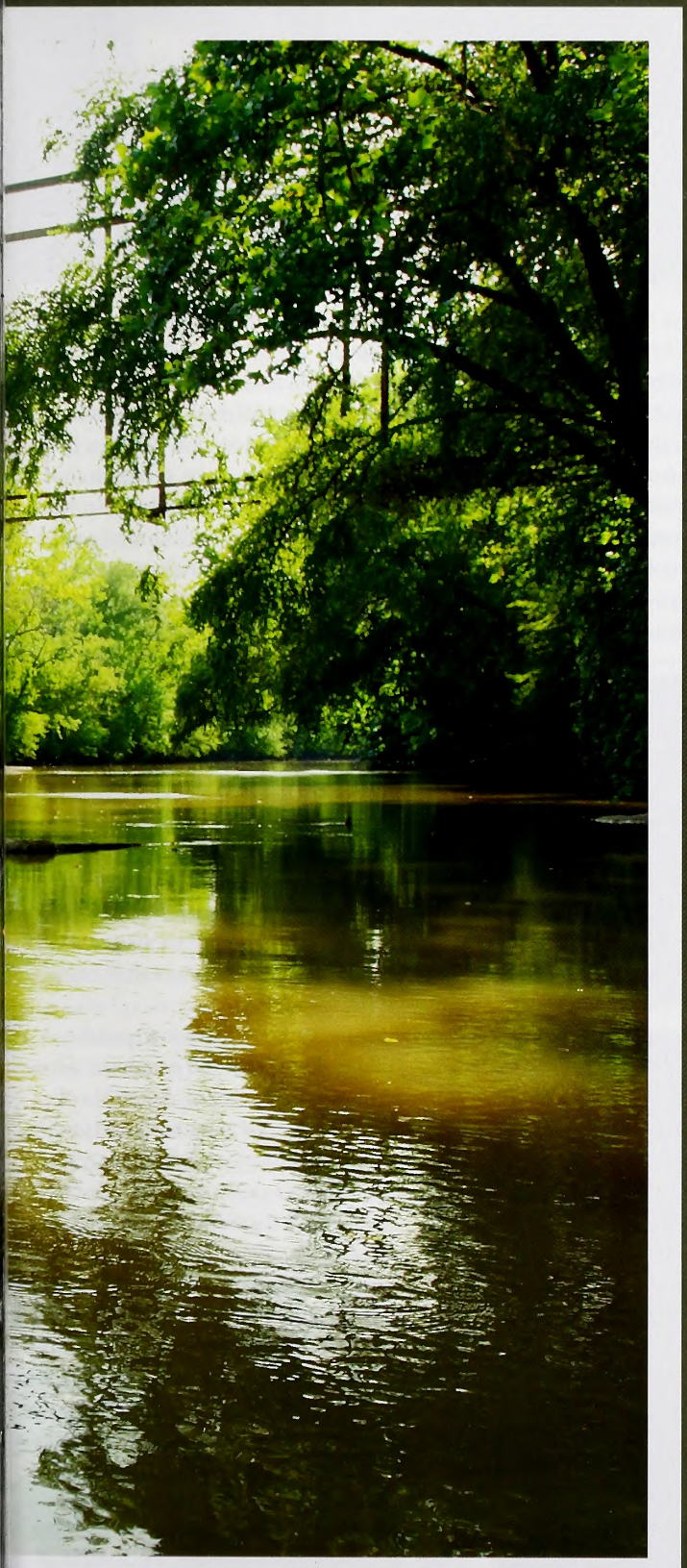
When Watermill Bridge came in sight, I was relieved. I was ready for this trip to be over. Looking back, we were very lucky in so many ways. Fishing gear, a camera, a paddle and a front seat can all be replaced, but a life can't.

The next summer we floated the river just once. This time we wore life jackets, fastened gear to the thwarts and brought only what we needed. Above all else, no anchors were thrown out. ◆

Jeremy Grady is a freelance writer from Morganton and occasional contributor to Wildlife in North Carolina.

The Many Faces of the Dan River

Part I



As it winds through Virginia and North Carolina, the Dan presents several faces but the same conservation issues.

Written by Bruce Ingram
Photographed by Melissa McGaw

I am kneeling on a boulder after just hitching myself up the massive rock when I spot what I have been looking for. There, bubbling up between moss-covered rocks on the left and rhododendrons on the right, is a headwater spring of the Dan River. The air smells earthy—a mixture of pristine water, decaying leaves, lush rhododendron, and verdant sugar maples, ashes and ironwood.

I am on a two-year quest to explore the multiple faces of the Dan River, from where it trickles up from springs in Virginia's Patrick County to where it disappears into the immensity of 48,900-acre Kerr Lake. North Carolinians reading that the Dan begins in the Old Dominion may well wonder what the Virginia section of the river has to do with whether or not they catch fish from the waterway in Carolina. And the short answer is, *Everything*.

For no river that I have ever explored is so intertwined with two states. How Virginians treat the waters of the Dan has truly everything to do with how clean and clear the North Carolina portion is—and the reverse is true as well. This is so because, although the Dan begins and ends in Virginia, it flows deep into North Carolina for much of its length but often meanders between the two states.

Here, then, are the many faces of the Dan, as well as the virtues and fisheries that give the river such charm, and the challenges and problems that the waterway must overcome in the years to come.

Patrick County Headwaters

My journey begins on a summer day as guide Mike Smith, who operates Greasy Creek Outfitters in Willis, Va., and I drive down the Blue Ridge Parkway. We pass the famous Mabry Mill and note that the pond that borders the mill is part of the Dan River watershed. We also stop briefly to fish a native brook trout rill that flows into the Dan. North Carolinians may be surprised to learn that they don't need a nonresident license to fish any trout stream within the Virginia section of the Blue Ridge Parkway, as both states' licenses are honored on all parkway waters.

Mike Smith of Greasy Creek Outfitters tries his luck for trout on the upper stretches of the Dan River near Danville, Va. Many of the hemlocks in this area have been infested by the woolly adelgid, and some of the large trees have fallen into the river.

But our real destination is a few miles past the mill, Townes Reservoir—more specifically that part of the Dan River that flows into the impoundment and courses through what some folks call the Grand Canyon of Virginia.

Accessing the reservoir requires some planning, as Townes Reservoir and its sister, upper impoundment Talbott Reservoir, are part of the Pinnacles Hydroelectric Project, which the City of Danville owns. One has to obtain a free visitor's permit from the city, which includes the daily combination to a locked gate at the entrance of Townes Reservoir, and wait until 8 a.m., when city personnel open another lock on that same gate.

Smith and I drive down a precarious road to reach Townes Reservoir and then paddle his canoe some 30 minutes to where the Dan rushes into the impoundment. Beaching the boat, we wade a few feet, and almost immediately the lake is left behind and we enter the canyon. Steep mountainous terrain envelopes both sides of the Dan, as the river charges past banks where rhododendron, beeches, alders, sycamores and the odd red oak crowd the shoreline. Along the shoreline and sometimes within the river, boulders half the size of compact cars pock the area.

Sadly, though, we mark dead hemlock after dead hemlock, corpselike, wan sentinels on the river, victims of the woolly adelgid. Mike says that many hemlocks have crashed into the stream since his last visit.

On his second cast Smith drifts a size 12 Adams through a riffle, and a 7-inch wild brown sips in the offering. He catches and releases the fish and a few minutes later does the same with a slightly larger rainbow.

"It is serious business when you travel back into the canyon," Smith says. "I once had a guy twist an ankle, and it took us four hours to evacuate him out of here and back to the canoe.

"But just look at the majesty of these mountainsides," continues Smith as he gestures to the rugged terrain that has been chiseled through the ages by a stream that is no more than 40 feet wide. "The Dan here has a great trout fishery, with mostly wild browns between 6 and 15 inches, and a fair number of rainbows about the same size. But it would be worth coming in here even if the fishing were just fair."

In a four-hour period, we wade a little more than a mile upstream, periodically watching 'bows and browns rise to our flies, and often noticing the sounds of Acadian flycatchers, Eastern wood-pewees, wood thrushes and a host of other birds. But the City of Danville requires that everyone be out of the canyon and off the property by 5 p.m., and Smith and I want to visit one of the native brook trout streams that commingle with the reservoir.

So we hike out of the canyon, paddle down Townes Reservoir and beach the canoe where a likely stream enters. A jumble of boulders lies where the stream flows into the lake, and we have to ascend them, careful not to break bones or fly rods. Smith has fished this creek before and has regaled me all morning with stories of its numerous native brookies. But in two hours of fishing the Dan River tributary, not a single trout rises to our offerings. The water has a curious stain to it, and I make a mental note to check into the matter later.

Once we leave the Pinnacles Hydroelectric Project, Smith drives me to the upper upper Dan, where the river is just the proverbial "hop, skip and a jump across" and is a put-and-take trout stream. He says that

superlative wild trout fishing also exists above Talbott Reservoir, but it is the waters of the Grand Canyon that still have the greatest attraction for his sporting soul.

Below Townes Reservoir to the Pinnacles Powerhouse, continues Smith, the Dan is catch-and-release fly-fishing only. Below there, the Dan for the rest of its voyage through Patrick County is a standard put-and-take trout stream.

North Carolina and Conservation Issues

The Dan rambles into North Carolina for the first time in Stokes County and is designated Hatchery Supported Trout Waters from the Virginia state line downstream to a point 200 yards beyond the end of State Road 1421. The first part of the Dan in North Carolina receives a great deal of fishing pressure (especially after stockings), and its trout have a reputation for wariness and selectivity regarding fly and lure offerings.

A few days later, still troubled by the curious stained water of the native stream, I make some phone calls and learn that runoff from agricultural and cattle farms is a serious concern on the Dan watershed, and that Virginia law does not require that farmers keep their cattle out of streams—native brook trout rills downstream or otherwise. I then contact Roger Holnback of the Western Virginia Land Trust and ask if his organization is having much success in recording conservation easements in Patrick County.

Conservation easements are voluntary, permanent agreements wherein a landowner agrees to give up certain development rights. The more development rights a landowner relinquishes, the more tax and other financial benefits the individual or family receives. I, for example, have placed 392 acres I own under conservation easements. I have seen my taxes on the parcels dramatically decrease and received other tax benefits totaling many thousands of dollars. I also have gained the satisfaction of knowing that I have permanently protected wildlife habitat. For fishermen, a major plus of easements is that they often serve to protect riparian zones.

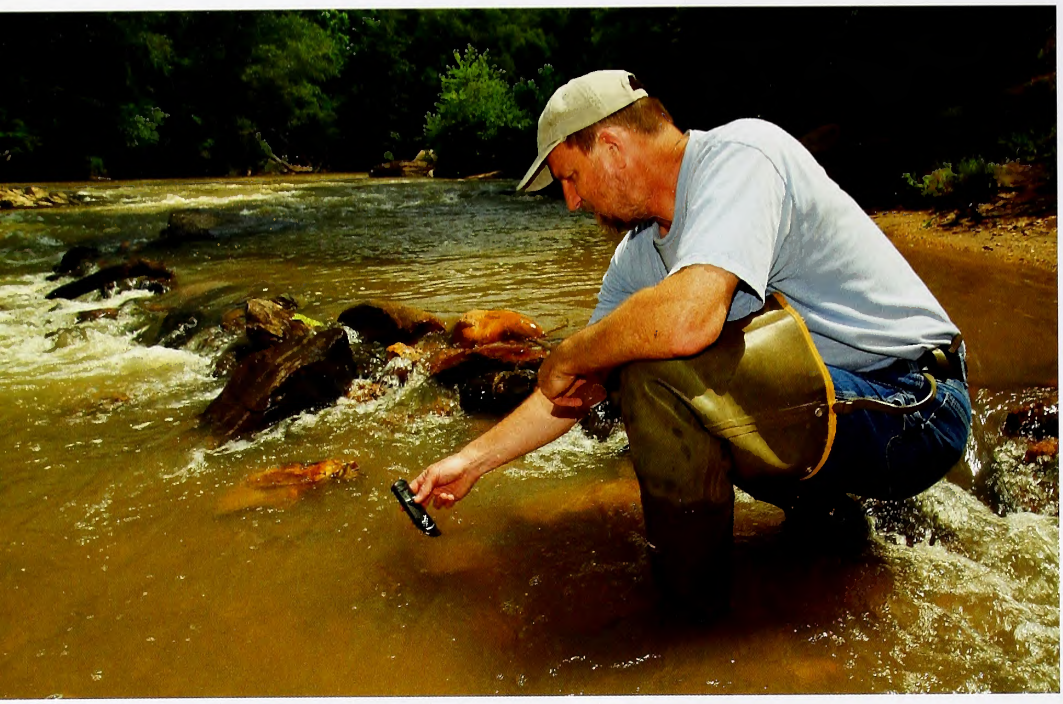
Holnback says that six easements totaling 917 acres have been placed in Patrick County. Although none of that acreage is on the Dan River itself, much of it does include land within the watershed.

"What we are seeing in Patrick County is typical of what is going on in the western Piedmont of North Carolina and Virginia," says Holnback. "Folks are moving up from urban areas in North Carolina and buying former 100-acre farms that have been split up into 10- to 20-acre parcels, each with its own hilltop. Then the buyers build a home or vacation getaway on that hilltop—a place with a view.

"Conservation easements really have not caught on here yet, but the interest I am seeing is coming from two groups. The first is from the 'come-heres,' people from outside the area who have built their homes here but don't want to see the county further developed. And the second is from the 'from-heres,' multi-generational farmers who are worried about the development and don't want to see their land broken up when they die."

Holnback suggests that I call the Piedmont Land Conservancy (PLC) in Greensboro, and I contact Kenneth A. Bridle, its stewardship director. Bridle has actively worked on the Dan River watershed for the past 25 years and has done Natural Heritage Inventories in Stokes and surrounding counties, riparian corridor studies, watershed plans and sediment studies. He has built canoe access sites, done stream restorations and surveyed for rare plants and animals, plus he is a current member of the Dan River

Development, such as this in North Carolina's Stokes County, can have negative impacts on the watershed. Developments along the Dan tend to be fairly sparse, giving conservationists and government a little time to mitigate possible damages.



Ken Bridle of the Piedmont Land Conservancy takes stock of the Dan with a multimeter (top), which measures dissolved solids and conductivity, and a turbidometer (above right) at Morotock Park in Danbury. Unrestricted ATV use (opposite page) can contribute to riparian damage.

Basin Association (DRBA) and is in the early stages of a 12-month water sampling survey.

"We have conducted Natural Heritage Inventories in all of the counties that are in the Dan River Basin, and we have done N.C. Clean Water Management Trust Fund-sponsored riparian corridor studies of the entire channel," Bridle says. "We also received several grants to study the suspended sediment in the river and to prepare a Dan River Watershed Protection Plan, which was published in December of 2006.

"This watershed plan is the most comprehensive collection of data and recommendations on the upper Dan River Basin, including the Virginia portion. We have also received grants for the purchase of properties and easements in Stokes and Rockingham counties and have recently spent signifieant effort on the establishment of and land purchase for the new Mayo River State Park in the middle of the watershed. This park is being matched by an effort on the Virginia side to put the upper reaches of the Mayo into a Virginia state park."

As is true in Patrick County, few properties are under conservation easement on the North Carolina part of the Dan watershed, says Bridle, as a long-standing resistance to land use planning exists.

"Residents, the from-heres and come-heres in both states, don't see the threats to water quality and loss of scenic and ecological values," continues Bridle. "In this area, development does not occur in big easy-to-see blocks, such as malls and multi-hundred-home housing developments, like in the urban counties to the south, but in subtler, harder-to-notice scatterings of new homes, new roads, loss of smaller chunks of forests and farms and ultimately a harder-to-perceive-and-regulate land conversion. The citizens and politicians just don't see the threat or loss, possibly until it's too late. And unless land trusts have willing landowners who perceive the threats and want to do conservation easements that would help mitigate the threats, then there is really no market for this kind of conservation activity.

"It might be argued that since the watershed threats are not dramatic, they are also not imminent, which is true. But we know that now is the time to work, when there are reasonable land values, big blocks available and resources still worth conserving. By the time threats are obvious, all the resources are impacted, the costs are much more and conservation potential is limited."

The most effective areas of impact have been where the PLC has been able to meet a wider range of conservation-minded landowner needs and also put a lot of easements in a focus area. The PLC has placed much emphasis on inventory, survey, sampling and coalition building, and only recently has a new swell of interest started that will lead to more productive conservation partnerships.

Bridle says the Dan River watershed is facing the same pressures that all of North Carolina's Piedmont is dealing with. He sees as some of the factors "the need to improve agricultural best management practices, especially on farms in transition to new crops or new land use; increasing residential development and resultant stormwater runoff; riparian buffer impacts; lawn and agricultural chemical impacts; non-point-source sediment pollution; plastic trash and litter; and ATVs being ridden in ereeks and the river."

But Bridle also lists a number of positives, including the following.

- New communication across the state line between agencies
- Increased recreational use of the river because of the Dan River Basin Association's outings and programs
- The potential impact on the area of the Mountains to Sea Trail coming through
- New rare aquatic species discovered in the Dan
- The new state parks and potential to designate a Dan River Trail State Park
- A push to make some of the Stokes County canoe access sites permanent
- New county tourism boards

The Carolina Dan Becomes a Smallmouth River

I ask Kevin Hining, District 7 fisheries biologist for the N.C. Wildlife Resources Commission, to give an overview of the Dan as a smallmouth river.

"To be honest, I don't think many anglers outside Stokes County know about the Dan," he says. "I've heard few people talk about it, but from what I've seen, the section in Stokes County downstream of N.C. 704 is a really fun smallmouth river. We haven't seen any monster fish, but lots of smallmouth in the 12- to 16-inch size range. Also, we've talked to a few anglers who routinely catch larger fish than our samples indicate."

As the Dan continues its path through Stokes County, it passes under the Flippin Road Bridge and through the communities of Joyce Mill and Jessups Mill. Once again, the Dan flows through a gorgelike area, and two Class III rapids mark the waterway. But the swift water comes to an end in the backwaters of Jessups Mill Dam.

Downstream from the dam to the Highway 704 bridge, a distance of about 6 miles, the Dan is known for its remoteness and white water. Paddlers may also encounter the James River spiny mussel, an endangered species.

The next section is the 12.4-mile float from the Route 704 bridge (known as the Hart Access) to the Hanging Rock State Park access. Lexington's Anthony Hipps and I conduct a summertime float of part of this section (that is, 4.5 miles from Moores Springs Campground to the park) and catch smallmouth bass and redbreast sunfish.

What impresses me most is that both banks are heavily wooded, almost throughout the entire excursion, and cliffs up to 60 feet tall often appear. Songbirds are numerous, highlighted by appearances from scarlet tanagers, red-eyed vireos, orchard orioles and hooded warblers. When the rhododendron is in bloom, the white flowers add ambience to our junket.

For Part II of this exploration of the Dan, I'll cover the river from Hanging Rock State Park to Kerr Lake from fishing and conservation viewpoints, as well as look at how some landowners are proving to be good stewards of the watershed. ◆

Bruce Ingram is the author of several books on rivers and fishing, including, "Fly and Spin Fishing for River Smallmouths" ($19.25). To purchase one, contact Ingram at be_ingram@juno.com.

Information Sources

Dan River Basin Association: www.danriver.org/RiverInfo/RiverInfo.htm

Greasy Creek Outfitters: www.greasycreekoutfitters.com, (540) 789-7811. (Mike Smith offers guided trips and is author of the book "Fishing the Roanoke Valley," which covers the upper Dan River.)

Hanging Rock Outdoor Center (canoe rental): www.hroconline.com, (336) 593-8283

Hanging Rock State Park: www.stateparks.com/hangingrock.htm, (336) 593-8480

Piedmont Land Conservancy: www.piedmontland.org, (336) 691-0088. The PLC covers the nine Carolina counties in the northwest Piedmont and includes all of the Dan River Basin. The partners the PLC works with include the Soil and Water Conservation Districts, Natural Resources Conservation Service, U.S. Fish and Wildlife Service and N.C. Forest Service.

Stokes County Tourism: www.visitstokesnc.com

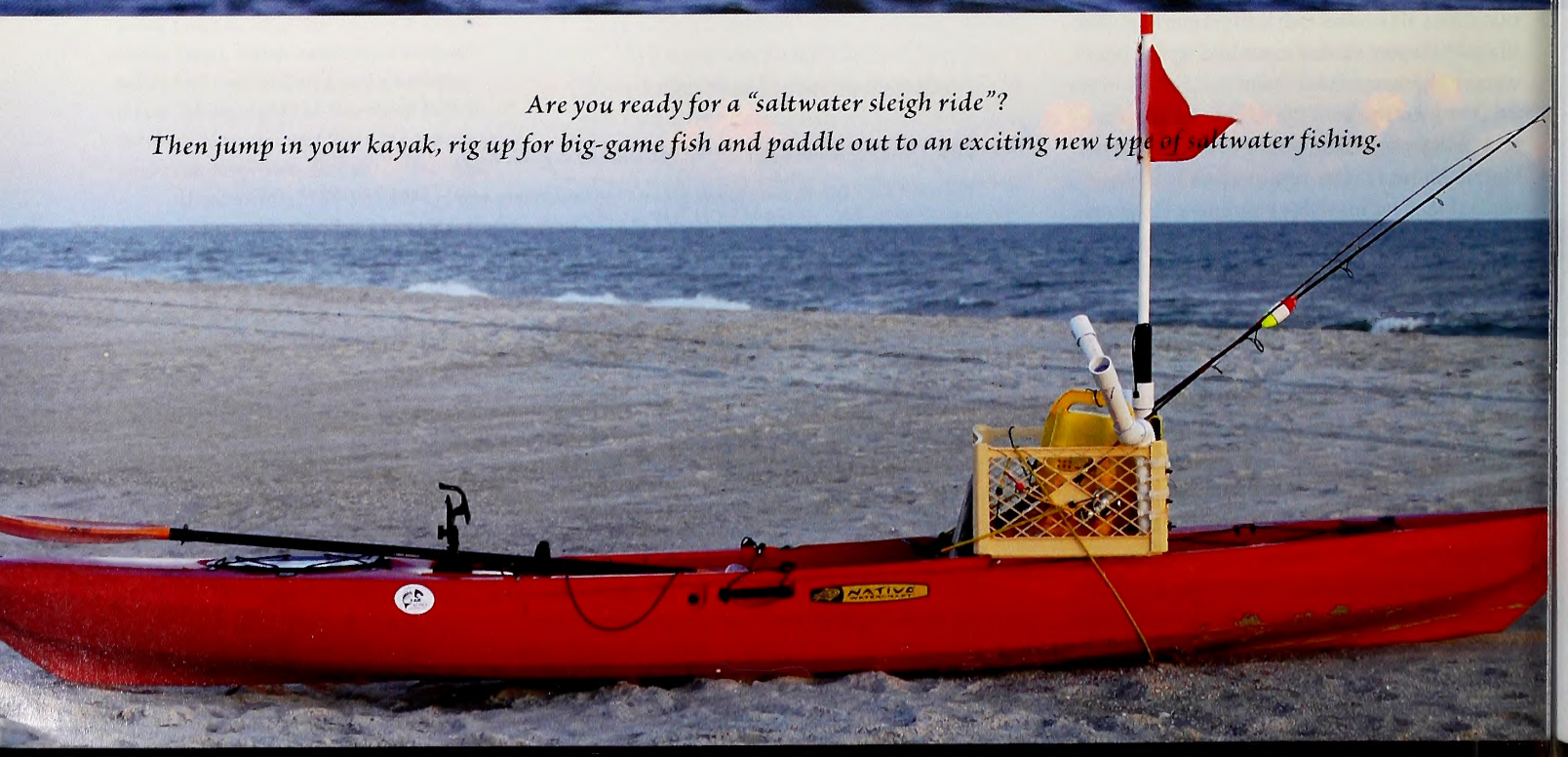
Virginia Canals and Navigation Society (sells the Dan River Atlas, a wonderful source for paddling the river and learning about its history): www.vacanals.org

Western Virginia Land Trust: www.westernvirginialandtrust.org, (540) 985-0000

Kayaking *for* KINGS

Written by Mark Patterson & Photographed by Angela Schlentz

Are you ready for a "saltwater sleigh ride"?
Then jump in your kayak, rig up for big-game fish and paddle out to an exciting new type of saltwater fishing.



MY FRIENDS AND I STAND ON THE SANDY BEACH AS THE SUN SLOWLY BURNS OFF THE MORNING MIST. Quietly we scan the brightening skies for the first sign of pelicans circling high above the water. Nothing at first light—and then they appear. One by one they climb higher and higher and then dive, folding their wings and twisting slightly just before impact onto the sea's surface. They become a waterfall of birds crashing into the densely packed school of menhaden. The school is only 300 or 400 yards offshore, easily reachable by the eager band of kayak fishermen grinning broadly in anticipation of the adventure that lies ahead.

It is all we can do to contain our excitement as we help one another carry our kayaks to the edge of the surf. We begin counting the waves and discussing the best window of opportunity to launch. Some days, normally in the late fall, the sea is so calm that it looks like a giant lake, and entering and exiting is easy. Other days it's too rough for anyone with common sense to even consider ocean kayaking.

A simple one- or two-man sit-on-top kayak, a homemade livewell with rod holders, and some human paddle power are all you need to fish for toothy, hard-fighting king mackerels.

WITH A LITTLE LUCK AND A LOT OF PATIENCE, WE WILL FEEL ONLY THE RUSH OF ADRENALINE AS WE PADDLE OUT OF THE SURF ZONE, NOT THE RUSH OF SEAWATER HITTING US SQUARELY IN THE CHEST.

Today is somewhere in the middle—if you can get past the breakers, it's smooth paddling. By looking for the troughs in the sets of waves coming in and then counting the number of waves between these moments of calm, we get a better chance to launch our kayaks without getting a wave or two over the bow. With a little luck and a lot of patience, we will feel only the rush of adrenaline as we paddle out of the surf zone, not the rush of seawater hitting us squarely in the chest.

On this day, everyone makes it successfully out of the breakers in the surf zone, and we paddle as fast as we can toward the diving birds. Sometimes they disappear as swiftly as they came, leaving you wondering if you really saw them at all.

BAITING UP

When we are within 50 yards or so of the diving birds, we begin casting "jerk rigs." This homemade tackle consists of three or more treble hooks tied in tandem onto a 2-foot section of 20-pound fluorocarbon with a 1-ounce weight at the end. This arrangement allows for long casts and fast sink rates. It is cast into the school of menhaden and allowed to sink to the bottom. Once you feel the line go slack, you reel down until the line goes tight and "jerk," continuing this until you snag a menhaden. If you're lucky, you might even get two! Using a light spinning rod to catch bait is fun in itself because a large menhaden can pull harder than you would think.

FISH THE OAK ISLAND CLASSIC

The inaugural N.C. Kayak Fishing Association Oak Island Classic Kayak Fishing Tournament is scheduled for Oct. 9 at Oak Island. There will be four divisions: king mackerel, flounder, drum and trout. Information on entry and sponsorship is available at www.nckfa.com.

When you do hook a menhaden or two, you want to handle them gently, as they are delicate and die quickly if damaged. If at all possible, use an unhooking device to remove the baitfish without touching it, and place it in either a large trolling bucket or a homemade bait tank located on the back of the kayak. This bait tank can be as simple as a 5-gallon bucket with a bubble maker attached or as advanced as the one I have on the back of my kayak (see sidebar).

It's smart to resist the urge to start trolling with the first bait or two you catch. Instead, stay on the school of baitfish and catch all the menhaden that you can keep alive and healthy. It is better to have bait left over that you can simply release than to be in the middle of a killer bite and have nothing left to fish with.

On this particular day, if we had not seen any pelicans diving, we would have cast Gotcha plugs for another great king mackerel bait—bluefish. Small bluefish are normally plentiful and easy to catch much of the year, and they too can be kept alive for a long time in the bait tank.

GEAR AND TECHNIQUE

The baits are deployed on the same type of rigs that king mackerel fishermen in boats use, with the exception that the leaders are shorter due to the difficulty in rigging the flopping baitfish while sitting down and not hooking yourself in the process. We use portable depth finders to locate water in the 20- to 30-foot range. King mackerels will feed actively at this depth, and it's close enough to shore that kayak anglers can get back quickly should wind pick up or a storm roll in.

A comfortable paddling speed is about 1 to 2 miles per hour, which just happens to be the perfect trolling speed. It is possible to use two rods while trolling from a kayak, and the best way to do this is to add a 1-ounce trolling sinker to one of the lines and allow the other to troll on the surface with no weight. If you make wide and slow turns, the lines will not cross.

The two-rod method works great if you have a tandem kayak because, once hooked up, you can hand one rod to the person in front and they can fight the fish while you reel the other rod in. However, most kayak anglers troll with only one rod if they are solo because it is difficult, if not impossible, to get the second rod in while you have your hands full fighting a king mackerel alone. Keep it simple to avoid tangles.

To find the proper water depth for king mackerels, an electronic depth finder is a handy piece of equipment to have on board. Paddling out into the surf can be tricky, but surfing back in can be fun if done correctly.

Kayak design and outfitting have come a long way in the last few years. The choices available are almost limitless now in the types, lengths, materials and styles available. To explain it simply, there are two main types of kayaks: the traditional sit-inside, or decked-in, boat and the sit-on-top, the choice of most kayak fishermen. Sit-on-tops have what are called scupper holes located around and through the decking, allowing water to run down and out instead of pooling in the bottom. This is great when you are fishing in the ocean and a wave or two goes over the deck of your boat.

Another benefit of sit-on-tops is that if you overturn, you can easily right the kayak, the water runs out and you can remount. The drawback to the sit-on-top is that you are exposed to the elements, and more than likely you are going to get wet. It might not be the best choice for those who fish in cold water or cold weather.

Sit-inside kayaks offer the ability to add a "skirt" to keep you dry even in the wettest conditions. The skirt also traps body heat to keep you warmer.

The author (left) and friend Tim Stamper show off the results of a kayak kingfishing excursion.

THE BITE IS ON

Having deployed the baits, we take a moment to catch our breath and adjust ourselves in the kayak seats. Paddling for between two and four hours can be taxing on the body, so it is best to get comfortable in the beginning.

There are several factors to look for when kayak fishing for king mackerel. First, clear water is essential. One of the king mackerel's biggest advantages as a predator is its excellent vision. In relation to its body, its eyes are huge. The clearer the water, the better the king mackerel can see its prey, and the better your chances are that it can see your bait. When trolling for kings, seek out the clearest water you can find and use coffee-colored or black hooks, leaders and swivels to increase your chances of getting a strike.

The second factor is water depth. You need to be in at least 20 feet of water. There may be tons of bait in the shallows (7 to 10 feet deep), but the kings don't follow them in that close. King mackerels will not come that near to shore because water that shallow makes it difficult for them to escape sharks, which feed on the same baitfish as they do. On several occasions when my kayak has drifted toward the shore during a battle, I have had king macks bitten in half near the end of the fight. This happened in water less than 15 feet deep and has never occurred when fighting the fish in deeper water. So, if possible, stay in water between 20 and 35 feet in depth.

Third, try to locate a school of baitfish under attack. Look for any surface disturbance that would tell of feeding fish. Sometimes it is merely a quick glimpse of silver or windlike ripples on the surface when there is no wind that alerts the angler of a school of frightened baitfish just beneath the surface. Other times, the water boils with thousands of fish jumping out of the water to get away from predators all around them. Of course, diving birds are the classic signal of a bait ball near the surface. Once an angler finds these three factors combined, the odds of actually hooking up skyrocket.

In our case, on this particular morning we are lucky, and in the distance we see more pelicans dive-bombing a tightly packed school of menhaden in 27 feet of crystal-clear water. We take a moment to observe which way the bait ball is being herded and begin paddling fast to get alongside the menhaden before they go down or get broken up into smaller balls. Remaining about 30 yards away from the feeding frenzy, we can actually see and hear the bluefish and mackerel slashing through the bait. We occasionally catch a glimpse of a dark gray triangle-shaped dorsal fin that nobody seems to acknowledge.

Moving in the same direction as the school, we troll our baits on the edge of the mayhem. We want to make our baitfish appear wounded and unable to stay within the semi-safety of the tightly packed center of the school. If, after five or 10 minutes of trolling in this manner, our offering is not taken, we will paddle faster than the school is traveling until our bait is slightly ahead of the school. We will stop quickly so our baitfish slowly sinks as it struggles against the hooks that weigh it down just enough to keep it from swimming properly. As the rest of the school catches up to our slowly sinking baitfish, the other fish will recognize that something is not quite right, and they will move away from the struggling baitfish. This makes it stick out even more. Just when you think the school has passed over your bait, that's when the strike occurs—and that is the case today.

Just as I begin to paddle again, my rod tip drops suddenly, and line begins to scream off the reel. "Fish on!" I yell as I struggle to take the rod out of the rod holder behind me and turn the kayak in the direction of the running fish. Once I have the fish directly in front of me, I lean back slowly and let the fish give me a saltwater sleigh ride as it heads for deeper water. The line peels off the reel with amazing speed. It's hard not to tighten the drag to try to stop the fish, but that would be a huge mistake. The keys to landing a king in a kayak are a light drag and patience. By adjusting the angle of the rod slightly, I

HOWARD COUPLAND

can put more pressure on the fish without touching the drag, and that is just what I do. Just before I get pulled out of earshot, I hear another member of our group yell "Fish on!" too. I smile broadly, knowing one of my friends is now into the biggest, fastest and toughest-fighting fish of his life. I am too, and it's a blast.

Forty minutes later, my king is making smaller and smaller circles around the kayak. I lean over slightly and see the silver-and-blue torpedo shape glistening 10 feet below. This is the most critical time in the battle. I lost my first four kings at the end of the fight by trying to horse them in, and they surged away at the last moment, pulling the hooks. Those experiences taught me to stay as calm as possible until the fish is lying on its side, completely exhausted.

After what seems like forever, that is exactly what this 25-pound fish is doing. With one swift sweep of the hand gaff, I hook him just behind the gill plate and hoist him into the front of the kayak.

I look back toward shore, now quite a distance away. As I think of the grilled mackerel steaks that we will enjoy tonight, my aching arms are given new strength. I begin the long paddle back. ⬘

Mark Patterson is the president of the N.C. Kayak Fishing Association. Find out more about the club at www.nckfa.com.

MARK PATTERSON'S KAYAK LIVE WELL

Using an old 10-gallon cooler, I built a live well that uses a 200-gallon-per-hour bilge pump and a 12-volt rechargeable battery to pump fresh seawater in, and an overflow hose that allows the water to exit the cooler and flow back into the ocean. This keeps eight to 10 large menhaden alive for up to six hours. It might seem like overkill, but menhaden need clean, fresh, well-oxygenated water to stay lively. If you're going to go through all the work to catch them, it's worth the effort to keep them alive once you've got them.

One important tip: If you decide to build something similar yourself, don't forget to put in a drain valve that you can open before you return to shore. Coming to shore is already challenging enough without a cooler full of water sloshing to and fro.

PHOTOGRAPHS BY HOWARD COUPLAND

Everyone's seen schools of fish. Why do they bunch together? Let's check out the advantages of

Staying in School

written by Jeff Beane / illustrations and nature activity by Anne M. Runyon

Groups of fish are called schools, but in their case, schooling has little to do with education and everything to do with survival. Perhaps 80 percent of all fish species exhibit schooling behavior during some phase of their lives, and around 25 percent school throughout their lives. In general, smaller fish species are more likely to school than larger ones, but there are many exceptions.

SAFETY IN SCHOOL

One basic and important reason fish form schools is fairly obvious—there is safety in numbers. Faced with a predator, an individual fish stands a much greater chance of survival when surrounded by hundreds or thousands of others of its kind than when alone. But the law of averages is not the only thing reducing the chances of predation. A group is better at detecting predators than an individual. The school itself may resemble a huge, single organism rather than a group of small ones, and many predators find this confusing, intimidating or even frightening. Many species stay in schools only when they are young and more vulnerable to predators, adopting more solitary lives as they mature.

The word "school" is of Dutch origin, meaning the same as "shoal"—a crowd or multitude.

STRENGTH IN SCHOOL

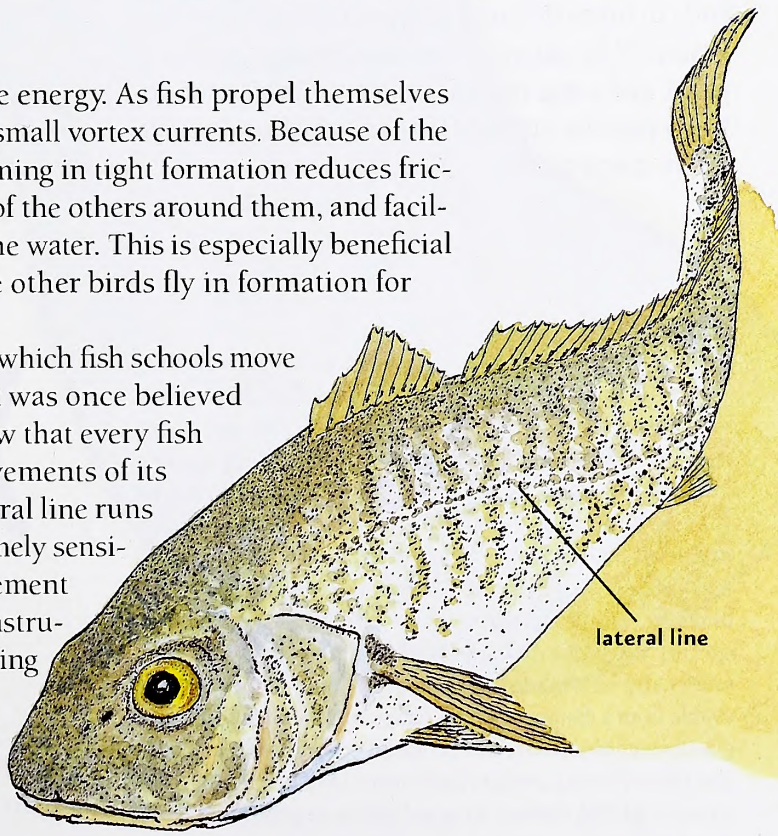
Safety isn't the only reason some fish species school. It can also be much easier to find food as a group, with hundreds of pairs of eyes and other sensory organs working together. Many predatory species, such as bluefish, tuna, mackerel, cod and jacks, spend most or all of their lives in schools, often hunting for schools of smaller prey species. For some fish, such as the notorious piranhas, schooling enables the group to overpower and consume much larger prey items than would be possible for single individuals. It's also far easier for fish to defend and maintain territories when working together as a large team.

When it's time to spawn, schooling provides still other advantages. No time or energy need be expended in searching for mates. Fish that spawn in large schools can overwhelm egg predators by releasing their eggs and sperm in vast quantities. Predators may gorge themselves and still not manage to eat nearly all the eggs. Group spawning offers each member of the school a good chance at adding some of its genetic material to the population. Some fish form schools or aggregations only for breeding purposes, otherwise leading solitary lives.

EFFICIENCY IN SCHOOL

Schooling apparently also helps conserve energy. As fish propel themselves through the water, their motion produces small vortex currents. Because of the hydrodynamic properties of water, swimming in tight formation reduces friction for fish swimming in the slipstreams of the others around them, and facilitates each individual's passage through the water. This is especially beneficial during long migrations (geese and some other birds fly in formation for similar reasons).

The grace, precision and efficiency with which fish schools move in unison has long fascinated humans. It was once believed that schools had leaders, but we now know that every fish in a school moves in response to the movements of its schoolmates. A sensory organ called a lateral line runs along each side of a fish's body; this extremely sensitive receptor detects tiny changes in movement and current in the water and is probably instrumental in maintaining formation and avoiding collisions in a rapidly moving school. Visual, electrical, magnetic and chemical cues may also be used—and perhaps some other means that we don't yet fully understand.



DANGER IN SCHOOL

Schooling certainly doesn't always guarantee safety. Not only are some predators not deceived, confused or intimidated by large schools, but many specialize in seeking out schools as convenient buffets. The "bills" of swordfish, marlins and sailfish and the "saws" of sawfish are structures especially adapted for feeding on close-schooling fish—these predators slash their bizarre snouts back and forth through a school, then circle back to feed on the fish they have killed or stunned. Some fish, especially when closely pursued by predators, may form a very compact school that at a glance resembles a huge ball or sphere. Fishermen call these tight schools "bait balls." Sometimes multiple predators converge on a bait ball and decimate it, with birds attacking from above and predatory fish or marine mammals from below. But usually a few individuals will survive to rebuild their school, or join with another.

All survival strategies have their advantages and disadvantages. Schooling has developed independently in many different groups of fishes, and is also practiced by many marine mammals, some tadpoles, and some marine and aquatic invertebrates. It is a popular strategy that has obviously served many species well.

Get Outside

Next time you're near a body of water, watch for schooling fish. Watch how they move and see if you can identify the species you see. Even in small streams, you may see schools of shiners, chubs or other minnow species. In larger streams, rivers, lakes, farm ponds and swamps, watch for various sunfish, mosquitofish, suckers and young bowfin or catfish. In inlets and brackish waters, watch for schooling mullet and killifish. In the ocean, you may see mullet, menhaden, bluefish, croakers, whiting, mackerel and many other species. Watch for diving seabirds and jumping species like mullet and bluefish to locate schools. Some schools may be visible from a distance as dark patches in the water. Polarized glasses and binoculars can be useful school-watching tools. The three North Carolina aquariums (Manteo, Pine Knoll Shores and Fort Fisher) are good places to get closeup looks at fish schooling behavior.

Read and Find Out

- "Fish Watching" by C. Lavett Smith, Cornell University Press, 1994.
- "Fish: An Enthusiast's Guide" by Peter B. Moyle, University of California Press, 1993.
- "The Freshwater Fishes of North Carolina" by Edward F. Merhinick, N.C. Wildlife Resources Commission, 1991.
- "A Field Guide to Freshwater Fishes, North America North of Mexico" by Lawrence M. Page and Brooks M. Burr, Houghton Mifflin, 1991.
- "A Field Guide to Atlantic Coast Fishes of North America" by C. Richard Robins, G. Carleton Ray, John Douglass and Rudolf Freund, Houghton Mifflin, 1986.

In *Wildlife in North Carolina:*

- "Loners and Socialites" by Lawrence S. Earley, October 1993.

Find out more about Project WILD Workshops and literature at the Wildlife Commission's Web site at www.ncwildlife.org.

Make a Bait Ball Sculpture

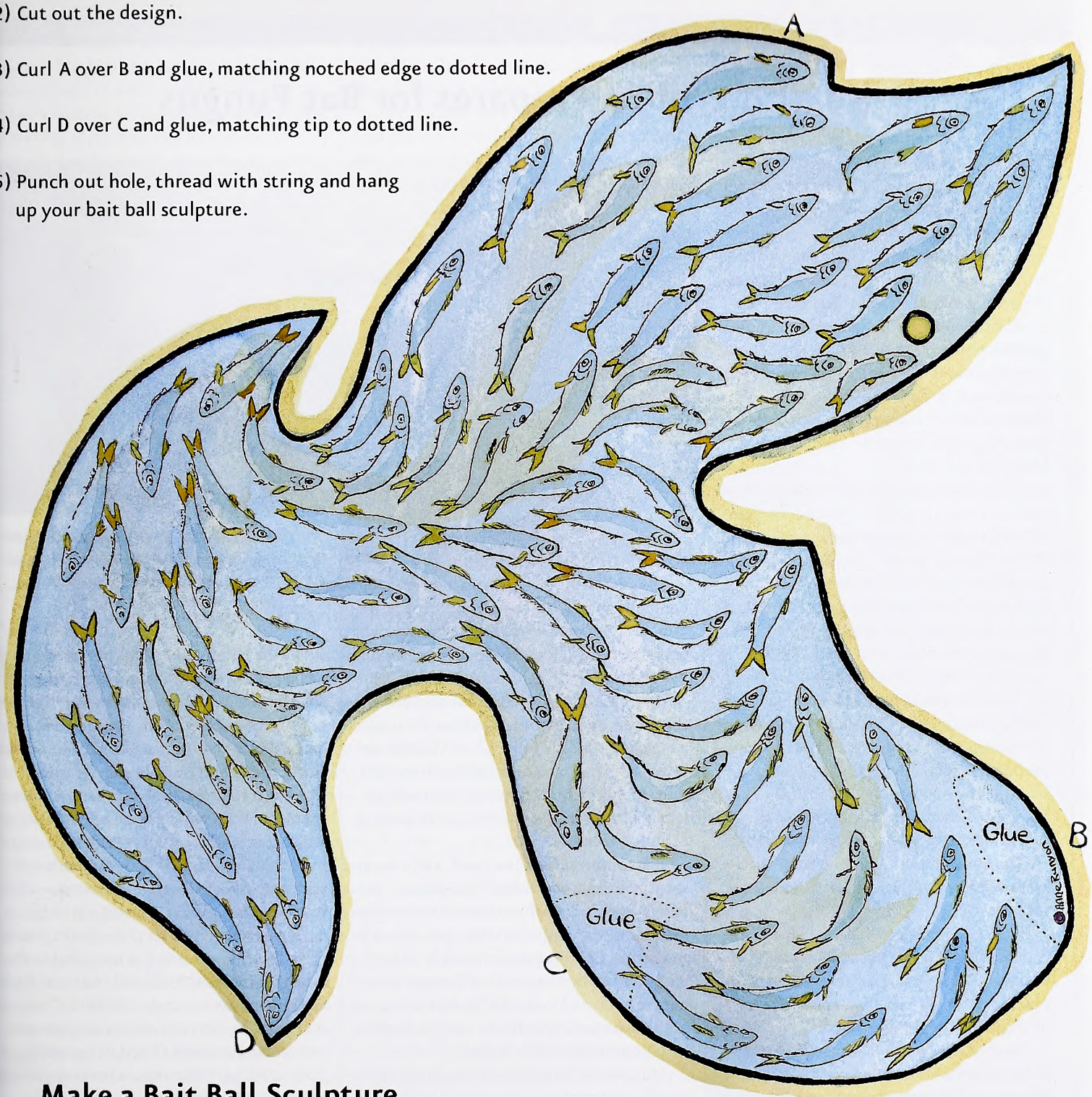
1) Copy and print your bait ball design on heavy paper. (65 lb. cover stock works well.)

2) Cut out the design.

3) Curl A over B and glue, matching notched edge to dotted line.

4) Curl D over C and glue, matching tip to dotted line.

5) Punch out hole, thread with string and hang up your bait ball sculpture.



...Make a Bait Ball Sculpture

6) Add sharks, tuna and gulls, all feasting on the bait ball fish.
The bluefin tuna and great white shark designs are in the February 2010 *WINC*.
The ring-billed gull is in the December 2009 *WINC*.

North Carolina Prepares for Bat Fungus

Wildlife biologists in North Carolina are keeping a watchful eye on the state's bat populations and preparing for the possible arrival of fungus that is associated with a deadly bat disease. White nose syndrome was recently discovered in the Tennessee portion of Great Smoky Mountains National Park.

North Carolina is home to a close cadre of bat biologists who annually monitor the state's bat populations. However, this year, in cooperation with the N.C. Wildlife Resources Commission, they're taking extra steps to protect bats and identify possible white nose outbreaks in the state.

"Given the potential impact this syndrome has had upon bat populations and the potential for broader impacts to the natural systems of this country, we are actively engaged with our conservation partners in the caving community and other agencies and organizations around the country to monitor the spread of this condition," said Chris McGrath, a biologist and Wildlife Diversity Coordinator for the Wildlife Resources Commission. "We're taking all reasonable measures we can to prevent spreading the fungus, and participating in national efforts to identify the causes and seek solutions before we've lost many of our bat species that serve an absolutely critical function in nature."

The commission recently finalized the "White Nose Syndrome Surveillance and Response Plan for North Carolina, In Concert with the U.S. Fish & Wildlife Service." The plan outlines a number of steps to protect bats while allowing biologists to pinpoint and investigate a possible white nose outbreak as quickly as possible.

Some of the signs biologists are looking for in their monitoring are white tufts of fungal growth on the bats' muzzles, damaged wings, bats active or clustered outside a cave during cold temperatures, or thin or dehydrated bats. The data collected by biologists is compiled by the commission to track population trends and to gauge impacts should white nose syndrome arrive in North Carolina.

NANCY HEASLIP N.Y. DEPT. OF ENVIRONMENTAL CONSERVATION

White nose syndrome, a deadly fungal infection, has been found in bats in the Tennessee portion of the Great Smoky Mountains National Park.

In order to protect the bats from possible contamination from biologists, strict decontamination protocols for both clothing and equipment are followed by biologists working with bats.

"We don't fully understand all the ways this disease can spread," said Sue Cameron, a biologist with the U.S. Fish & Wildlife Service. "We know it can spread bat to bat, but we strongly suspect humans can inadvertently carry it from cave to cave on clothing or equipment."

If an outbreak of white nose syndrome is suspected, state and federal biologists are prepared to investigate the extent of the possible infection, send suspected bats to be tested at the Southeast Cooperative Wildlife Disease Study Lab at the University of Georgia veterinary school, and make the landowner aware of the situation and what he or she can do to help limit the disease's spread.

Meanwhile, biologists are reaching out to people who may come in contact with bats, such as animal control officers and cavers, letting them know what to look for and who to contact if they see anything suspicious. The western North Carolina caving community, led by the Flittermouse Grotto (a caving club), has taken a lead role in communicating the severity of the issue to cavers and cave owners.

White nose syndrome was first documented in a New York cave in 2006 and has since spread into Canada and as far west as Missouri. It is nearly always fatal to many species of bats, wiping out cave populations within two or three years. Of special concern in North Carolina are the three federally endangered bats found in the state — the Indiana, gray and Virginia big-eared bat.

The North Carolina plan comes just as white nose syndrome has migrated to the state's borders, and after all National Park Service, U.S. Forest Service, Wildlife Commission and The Nature Conservancy caves in North Carolina were closed in the spring of 2009 to all but those researchers monitoring for white nose syndrome.

Thus far, preparation is focused on quickly identifying an outbreak and limiting transmission. There is no known treatment for the disease, though research is under way.

Commission Unveils Boating Access Locator, Acquires Costal Land

The N.C. Wildlife Resources Commission has launched a new, easier way to find more than 200 free public Boating Access Areas across the state.

The Interactive Boating Access Area Locator lets boaters search for a ramp by address, body of water or amenities. Once they locate a Boating Access Area, users can zoom in and out of the map, find an address, identify latitude and longitude coordinates, and print directions.

"Providing access to public waters and providing informative, easy-to-use tools to locate that access go hand in hand," said Erik Christofferson, chief of the Division of Engineering Services. "This interactive map, along with our more than 200 Boating Access Areas, is another way we are helping boaters across the state get in the water."

To access the map, visit the Boating and Waterways page at www.ncwildlife.org and click on Interactive Boating Access Area Locator. need more text or cut

In addition, the commission has purchased two coastal sites for Boating Access Areas, thanks to grant money from the Waterfront Access Marine Industry Fund. The Sneads Ferry site has an existing ramp that has been opened to the public. It will be renovated to include new docks, ramps and parking lot.

Design of the Hampstead site has begun and should be completed in 18 months. The site will include new docks, three new launch lanes, a parking lot and a bulkhead.

The N.C. General Assembly approved the $20 million WAMI Fund in 2007 as a way to pay for acquiring waterfront properties or developing facilities to provide or improve waterfront access for the public and marine industry. The WAMI Fund is administered by the N.C. Division of Marine Fisheries, with whom the Wildlife Commission has worked closely on several waterfront access projects.

Recently purchased Sneads Ferry access area.

NCWRC

Pisgah Offering Rod Loaners

Visitors to the Pisgah Center for Wildlife Education who want to fish but lack the necessary equipment can still wet a line, thanks to the N.C. Wildlife Resources Commission.

The Pisgah Center for Wildlife Education, located alongside the popular Davidson River in western North Carolina, hosts a rod loaner program that allows individuals or groups to borrow fishing rods and reels for use on area streams or lakes.

The program works just like a library. Anglers register at the Pisgah Center office to receive a tackle loaner identification card that lets them check out a rod and reel for the day. While the program is geared toward children under 16, anyone interested in fishing can participate. Anglers under 16 must have a parent or guardian complete the registration form.

After returning the loaner rods and reels to the park office, first-time participants under 16 receive a free mini-tackle box containing jigs, a small spinnerbait, hooks, bobbers, sinkers and a stringer. Anglers can use the tackle loaner identification cards at any Tackle Loaner Program site in North Carolina, but they must return the rods and reels to the original loaner site.

Located south of Asheville and adjacent to the Bobby N. Setzer State Fish Hatchery, the Pisgah Center for Wildlife Education is a N.C. Wildlife Resources Commission facility with aquatic ecosystems and cold water conservation exhibits and displays.

For information on the commission's Tackle Loaner Program, visit http://www.ncwildlife.org/Fishing/Fish_FTLP.htm or call the Division of Inland Fisheries, (919) 707-0220. For more information about the Pisgah Center for Wildlife Education, call 828-877-4423.

e NEWSLETTER

Get N.C. Wildlife Update—news including season dates, bag limits, legislative updates and more—delivered to your Inbox from the N.C. Wildlife Resources Commission. Sign up at www.ncwildlife.org/enews.

White Crappie Mark Broken Again

DUANE RAVER/USFWS

For the second time in less than month, a Nashville angler has reeled in the white crappie state record from the Tar River Reservoir.

Ray Patterson caught the latest record-breaker, which weighed 3 pounds, 12 ounces, on April 6, surpassing by one ounce the previous record.

Patterson used a cane pole and a live minnow, a bait he swears by, claiming a live minnow catches crappie in a way that no jig can. And he should know. Catching big crappies is a favorite pastime for Patterson, who fishes the reservoir for crappie at least three times each week from the first of April to the middle of June.

He said he's caught many crappies, some of which would have beaten the one that earned him the new state record. In fact, he said he didn't think the one he caught on April 6 was a record breaker. However, a couple of anglers in a boat beside him told him the fish was the biggest crappie they'd ever seen and suggested he have it weighed. Bill Collart, a fisheries biologist with the N.C. Wildlife Resources Commission, confirmed the fish as the new state record.

As evidenced by the last two state records, some of the best white crappie populations are found in Piedmont reservoirs such as the Tar River Reservoir. White crappies prefer structure and often are found near fallen trees, stumps, docks and thick stands of aquatic vegetation. This type of habitat is in abundance in the Tar River Reservoir, which is known for producing large crappies.

To qualify for the state record, anglers must have caught the fish by rod and reel or cane pole, have the fish weighed on a scale certified by the N.C. Department of Agriculture, witnessed by one observer, have the fish identified by a fisheries biologist from the commission, and submit an application with a full, side-view photo of the fish.

For a list of all freshwater fish state records or more information on the State Record Fish Program, visit www.ncwildlife.org.

CALENDAR OF EVENTS

Thursday–Sunday, July 1–4

Take part in the 38th Annual Cape Fear Blue Marlin Tournament at Wrightsville Beach.
Visit www.capefearbluemarlintournament.com.

Saturday, July 10

Check out the 47th Annual Coon Dog Day in Saluda. Festival includes live music, contests and judging for dogs.
Visit www.saluda.com.

Saturday, July 24

Learn about boats and boat-building at the Wooden Boat Festival at Cape Fear Community College in Wilmington. The event will feature more than 50 boats of various sizes. Contact (910) 362-7175.

Wednesday, July 28

Get into fly-fishing with Casting for Beginners, offered by the Pisgah Center for Wildlife Education. Class is held at Lake Imaging in Dupont State Forest. Call (828) 877-4423.
Visit www.ncwildlife.org

Readers should check with the contact listed before traveling to an event. Items for listing should be conservation-oriented and should be submitted at least four months in advance to jim.wilson@ncwildlife.org, or call (919) 707-0177.

Forbush Red, South Davie Earn Hunter Ed Titles

The 32nd annual Youth Hunter Education Skills Tournament, presented by the N.C. Wildlife Resources Commission on April 24 at Millstone 4-H Center near Ellerbe, saw record-setting attendance and record-breaking scores.

An estimated 3,200 people came for this popular competitive event, a component of the state's Hunter Education Program.

The tournament is open to teams that previously competed and qualified at a district level. Categories are orienteering, target shooting in archery, .22 rifle, shotgun and muzzle-loader, along with testing in wildlife identification and hunting safety knowledge. There are senior (high school) and junior (middle school and elementary) levels, with overall team and overall individual awards based on aggregate scores in all events.

The Forbush Red team won the senior division with 3,756 points, while the South Davie Middle School team won the junior division with 3,617 points. A perfect score is 4,000 points.

The senior division overall individual champion was Andrew Welker of Gray Stone Day School, with 772 points out of a possible 800. The junior division overall individual champion was Hunter Efird of Park Ridge Christian School, with 758 points.

GEOFF CANTRELL / NCWRC

Senior Division

Team	Points
Forbush Red	3756
Gray Stone Day	3724
E. Forsyth Blue	3717

Junior Division

Team	Points
South Davie	3617
Park Ridge Christian	3610
Perquimans	3594

Senior Individual Overall

Participant	Team	Score
Andrew Welker	Gray Stone Day	772
Levi Epps	W. Montgomery	767
Matthew Spartz	Lee Senior	767

Junior Individual Overall

Participant	Team	Score
Hunter Efird	Park Ridge	758
Matthew Flinchum	Starmount Orange	749
Logan Jenkins	Ridgecroft	748

The Forbush Red team (above) and South Davie team (below) won the senior and junior division titles, respectively.

GEOFF CANTRELL / NCWRC

GEOFF CANTRELL / NCWRC

IN SEASON

This month, these seasons are open in North Carolina:

Hatchery Supported Trout Waters: Through Feb. 28, 2011.

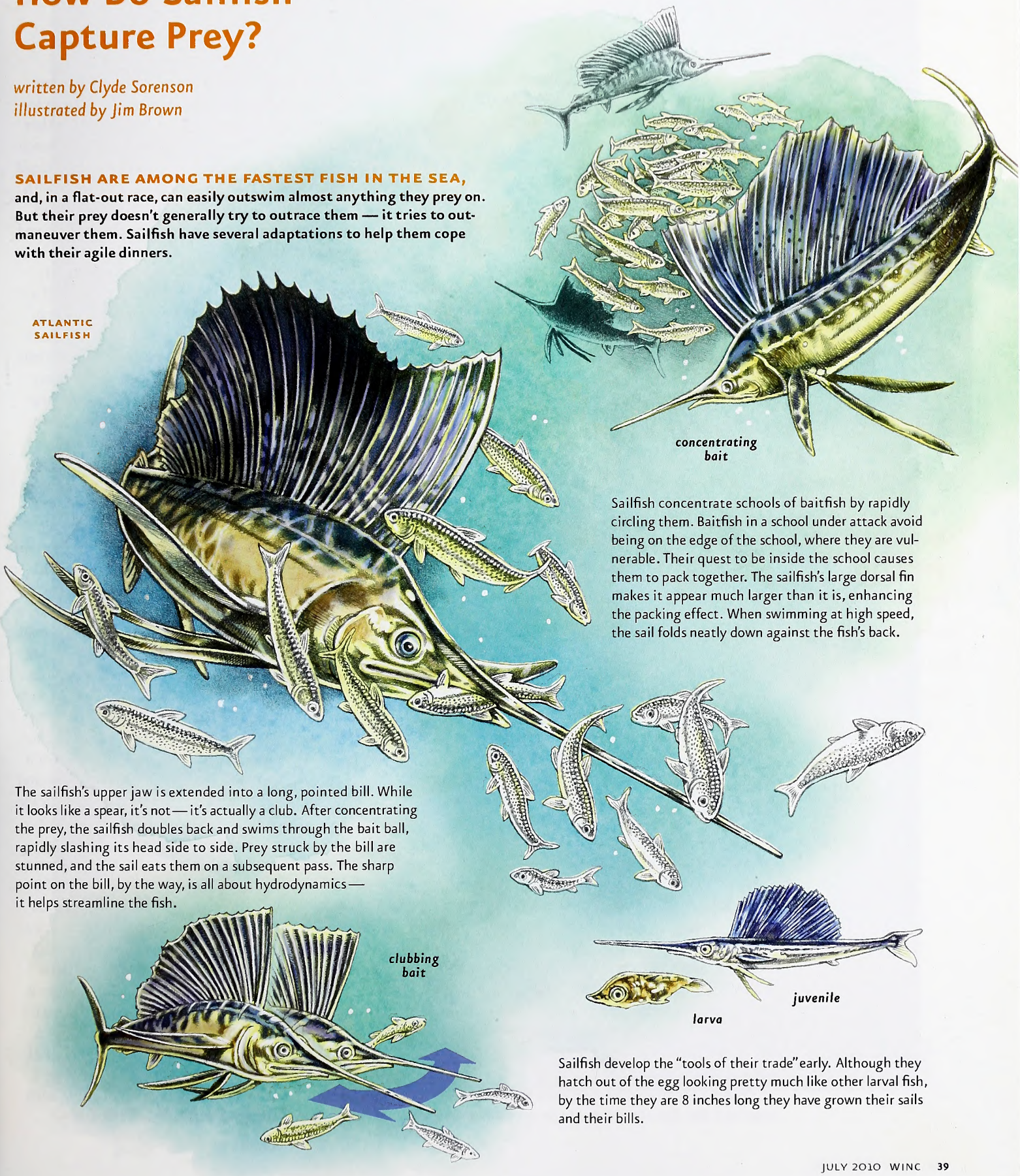
Crow: Wednesday, Friday and Saturday of each week through Feb. 28, 2011, plus July 4, Labor Day, Thanksgiving, Christmas, New Year's Day and Martin Luther King Jr. Day.

There is no closed season or bag limit for groundhog, coyote, striped skunk and nutria. There is an open season for taking beaver with firearms or bow and arrow during any other open season for the taking of wild animals.

How Do Sailfish Capture Prey?

written by Clyde Sorenson
illustrated by Jim Brown

SAILFISH ARE AMONG THE FASTEST FISH IN THE SEA, and, in a flat-out race, can easily outswim almost anything they prey on. But their prey doesn't generally try to outrace them — it tries to outmaneuver them. Sailfish have several adaptations to help them cope with their agile dinners.



Sailfish concentrate schools of baitfish by rapidly circling them. Baitfish in a school under attack avoid being on the edge of the school, where they are vulnerable. Their quest to be inside the school causes them to pack together. The sailfish's large dorsal fin makes it appear much larger than it is, enhancing the packing effect. When swimming at high speed, the sail folds neatly down against the fish's back.

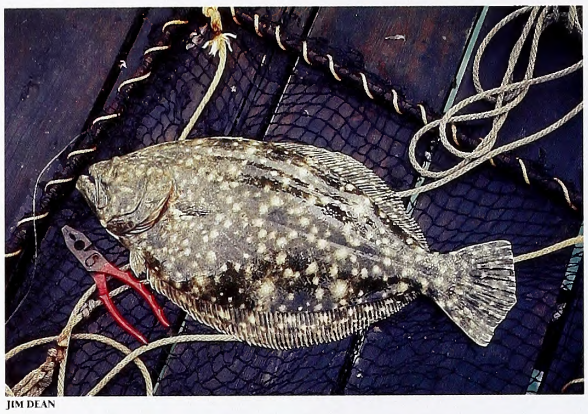
The sailfish's upper jaw is extended into a long, pointed bill. While it looks like a spear, it's not — it's actually a club. After concentrating the prey, the sailfish doubles back and swims through the bait ball, rapidly slashing its head side to side. Prey struck by the bill are stunned, and the sail eats them on a subsequent pass. The sharp point on the bill, by the way, is all about hydrodynamics — it helps streamline the fish.

Sailfish develop the "tools of their trade" early. Although they hatch out of the egg looking pretty much like other larval fish, by the time they are 8 inches long they have grown their sails and their bills.

Fishing in Neutral

written by Jim Dean

Tommy Jones and I launched the boat at Harkers Island and ran out the channel behind Shackleford Banks to Barden Inlet. To our left, the Cape Lookout lighthouse soared into an overcast sky. The water was gunmetal gray and there was a light chop, but the air was warm, almost tropical.



JIM DEAN

This was a therapy trip for both of us. Tommy had been working hard and wanted a short break, while I was anticipating an afternoon of uncomplicated low-tech fishing. We had no clear plan, nor had we bothered to bring more than a couple of light spinning outfits. One of my personal shortcomings is a persistent need to be prepared for any fishing opportunity that might present itself, no matter how unlikely. Not only does this clutter the boat, it clutters the mind.

"One of my personal shortcomings is a persistent need to be prepared for any fishing opportunity that might present itself, no matter how unlikely."

"I forget how refreshing it is to keep things simple," I said happily.

"Suits me," replied Tommy, who admirably never gets on a boat with more tackle than he can carry in one hand.

I had a cast net, but we didn't even bother to catch live bait. Instead, we used jigs tipped with curly-tailed soft plastic grubs or Gulps, and we fished holes and the edges of channels by simply dragging our jigs behind the drifting boat. When the tide or wind would take us past the most likely places, we'd run back to our starting spot and drift through again.

The fishing wasn't great, but it was fairly steady. We were mostly after flounder, and we caught perhaps half a dozen, including a nice one that we decided to keep for Tommy's mom and dad. We also caught a few small speckled trout, sea robins and bluefish—and far more lizardfish than we wanted. Of course, even one of these toothy, round-bodied critters is more than any fisherman wants. Worse, these aquatic cockroaches seem increasingly destined to take over the known inshore watery world. Tommy and his Core Sound neighbors have a better name for them that's—well, let's just say it's anatomical and clergical, if you can imagine.

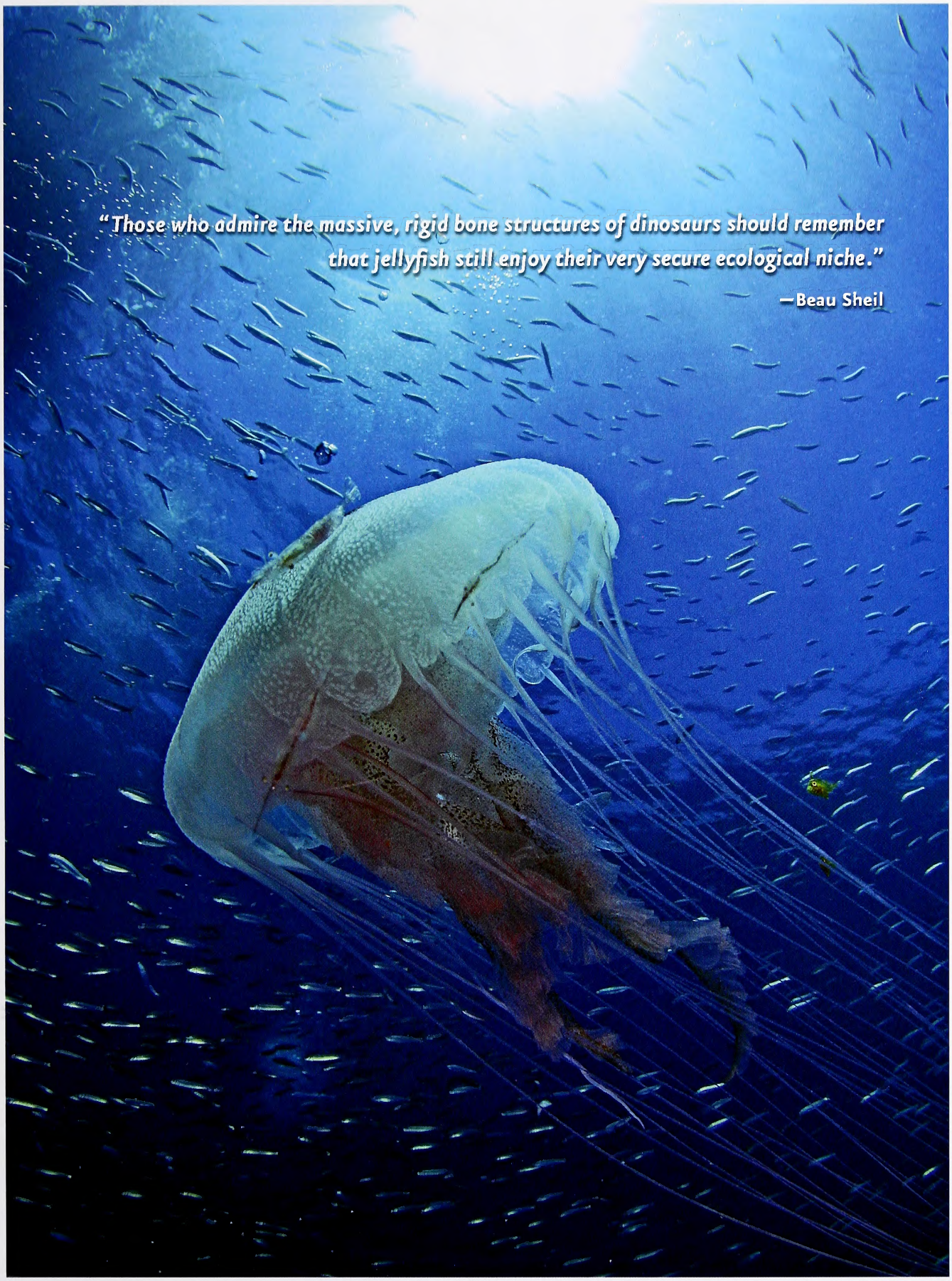
Even so, the lizardfish were only a minor annoyance on a day that turned out to be very pleasant and relaxing. In years past, I fished for flounders more frequently, and I have fond memories of drifting for them in Bogue Inlet with my son Scott and brother John during the 1970s and '80s. We didn't own much tackle, and our boat was old and decrepit. We dragged live finger mullets that we stalked in tidal pools with a cast net, or used strips of flounder belly or squid, and we almost always caught enough for supper (and seldom saw a lizardfish).

Pier and surf fishing for flounder is not significantly different, except that you don't even need a boat. I think I owned only one saltwater spinning outfit (a 1952 Conolon rod with a Langley Spinator) when I began fishing on the Emerald Isle Pier in 1960. That pier was very nearly my home during summer vacations until hurricanes destroyed it. We kept the live shrimp or finger mullets we used for bait in an aerated cooler, and fished mostly under the shore break. If you hooked a really big flounder, you often had to walk it to the beach. It was—still is—simple, successful and satisfying fishing.

It has the same basic appeal as surf fishing for flounders, spots, sea mullets and other inshore bottom fish. All you need is a light spinning outfit with 10-pound test mono, a simple two-hook bottom rig with a 2-ounce pyramid sinker, fresh shrimp, a sand spike, a folding chair and a small cooler for your bait and cold drinks. Anyone who can't achieve a blissful measure of mellow with a few hours of such activity (or inactivity, to be more accurate) is a truly harried soul.

You don't have to be a fisherman with an A-type personality to realize that there is an exponential factor involved in modern sport fishing—the more of it you do, the more complicated it gets. We chase more and more exotic species with increasingly high-tech tackle and tactics until one day we realize that we haven't the faintest idea how many rods and reels we own. Our hard drive is so overloaded with angling arcania that we can recite the recipes for 50 knots and 500 trout flies, but we have no idea where we left our car keys. These are clear symptoms of an imminent piscatorial backlash (and not on one of your many reels).

One bit of valuable advice that came out of the recent controversy involving runaway automobiles is that you're less apt to get into trouble if you switch gears to neutral. I don't know the technical term a psychiatrist would use for the mental equivalent of this, but we'd probably call it going with the flow. I can't think of a more literal application of going with the flow than drifting for flounders in a boat.



TODD PUSSER

Sea nettle

OUTDOOR MOMENT

IN THE AUGUST ISSUE

TODD PUSSER

SPINELESS WONDERS

North Carolina's native invertebrates are diverse organisms that live in every possible habitat statewide.

A GUIDING HAND

Mentoring is by far the best way to get people involved in hunting—and to keep them involved.

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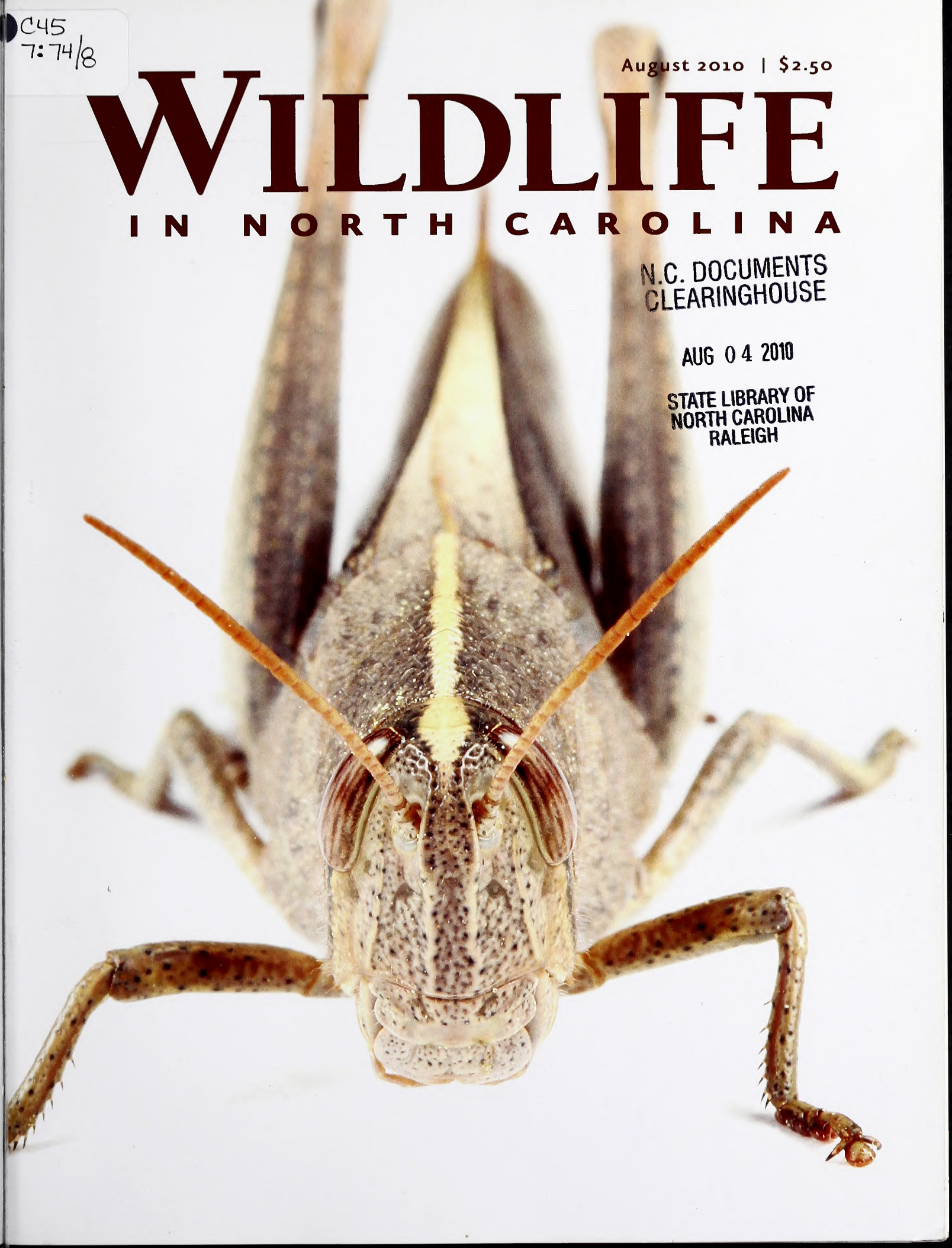

Hunter education such as this Becoming an Outdoors-Woman course is an excellent pathway to taking up hunting as a pastime.

PHOTOGRAPH BY MELISSA McGAW/NCWRC.

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Cover: North Carolina is loaded with invertebrates, from the rare to the everyday. The common mischievous bird grasshopper is part of the same order of insects as locusts. PHOTOGRAPH BY TODD PUSSER.

Wildlife in North Carolina is the official educational publication of the North Carolina Wildlife Resources Commission. It is dedicated to the sound conservation of North Carolina's wildlife and other interrelated natural resources and also to the environment we share with them.

EDITOR'S NOTE

It used to be easy to start hunting in North Carolina. Before you were old enough to carry a gun, you followed your dad or granddad into the woods or fields behind your house. You carried a stick in the same manner your elders carried their guns. You were a hunter in training.

MELISSA McGAW/NCWRC

When you were mature enough to handle a firearm, you shot tin cans off a fencepost until you got used to your weapon. Then you walked into the woods, by the side of the experienced hunter, treading carefully with your gun. When your quarry revealed itself, you fired and probably missed because of the adrenaline rush. You and your mentor laughed, talked about how to handle the situation next time, and continued on, still abuzz with excitement.

Except in isolated rural areas, or in families rich with hunting tradition, kids don't grow up that way in our state anymore. Development has made hunting land more difficult to find, and our urban lifestyles have distracted us from too many of our outdoor pursuits. Hunting is no longer a given.

The good news is that there are now more than 2 million acres in state game lands. Populations of many game animals are abundant. Hunting equipment is safer and more comfortable than ever. All that's left is to find someone to take you hunting.

That's where "Deet" James comes in. Although he grew up in hunting country, his immediate family did not include someone who could take him hunting. A favorite uncle became his mentor, and now he shares some of the lessons he learned as a boy in stories such as "The Mentor Advantage" on page 4.

Deet is the coordinator of the Hunting Heritage Program, an initiative of the N.C. Wildlife Resources Commission designed to jump-start hunter recruitment and retention through awareness and removal of barriers. He is somewhat of an evangelist for hunting, educating old and new hunters how the activity can change lives for the better. In his story, he provides detailed how-tos for mentoring and being mentored.

If you hunt, consider taking someone new out this year. If you haven't hunted but want to, check out Deet's story and start making the connections necessary to find a mentor. The resources, both wildlife and human, are out there for those who make the effort.

Greg Jenkins

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AUGUST 2010 VOLUME 74, NUMBER 8

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A Literary Meal

Just finished reading your Brunswick stew article ("Southern Perfection," June 2010). Brought back lots of memories of eating different Granville County stews. We lived on Grassy Creek at Morton's Bridge for about 20 years. For 15 of those years a group of us guys who hung out at Horrace Newton's and Paul Shotwell's stores would clean out our freezers and cook a stew. I had a large shop, so we would get together on Saturday night before Super Bowl Sunday and cook all the meat. On Sunday we put it together, and all Sunday afternoon and evening, neighbors would drop by for wildlife stew and fellowship. Around 75 to 100 people would show up. One year the stew contained deer, elk, moose, rabbit, squirrel, quail, dove, pheasant, duck, goose and maybe a possum or two. In later years we called it Road Kill Stew. We used basically the same recipe as yours except about half of the 30-gallon pot was heated up with Texas Pete and red pepper.

Jim Deal
Raleigh

I live in Oxford and think the best Brunswick stew around here is made by the rural volunteer fire department near Stovall. I am 79 years old and grew up in Wakefield, Va., Sussex County, between Suffolk and Petersburg on Route 460. When I was a child, Wakefield had a Community Day each year. They cooked stew in the huge pots with the paddles about all night and called it Squirrel Muddle. I don't know what was in it, as it was cooked down so much it was hard to say. It was very thick. It was served in paper trays with slices of white bread. I remember it was delicious. My mother would not eat it because of the squirrel meat. Thanks for letting me reminisce.

Lyn Dartt
Oxford

I just finished reading your Brunswick stew article and enjoyed same. If you can make yourself available to travel to the Salisbury area on the third Thursday in February, you might try the Brunswick stew put on by The Masonic Lodge. This has been an annual event for over 25 years. Although I am not a member of the lodge, several friends and I have enjoyed this event for the past 15-plus years.

Larry Clodfelter
Salisbury

I really enjoyed your story on stew, having grown up in Granville County myself and having made at least one stew each of the last 44 years. I am in full agreement with every word in the article. I got my recipe from the lady that oversaw the Hester Baptist Church annual stew and have used it with no adjustments all of these years. She told me that I should never put the tomatoes in the pot until all of the other stuff had fallen apart, or the acid in the tomatoes would keep the other items from falling apart. She was right, because years ago I tried putting the tomatoes in early. The potatoes and butter beans cooked, but they would never fall apart.

My black wash pot which I bought 46 years ago holds 25 gallons, and I used the same paddle up until this year. I had to retire the original paddle because I was afraid it was going to fall apart in the stew. I use 10 pounds of beef/pork and seven chickens, plus two squirrels, which I wrap in cheesecloth while they are cooking, remove after several hours and remove the bones. My recipe was in the book "Holy Smoke."

Ben Averett
Raleigh

As a child, I spent weekends with my family on my grandparents' Franklin County farm. It was there that I experienced my grandmother's Brunswick stew as did most children, picking through the thick slush for identifiable bits of potato, corn or green beans. One Sunday when I was about 10, my father kept me out at the pond all day fishing. When we arrived back at the house, my mom, who had driven separately, had left. All there was to eat was Brunswick stew. Famished, for the first time I ate it by the spoonfuls. That was the beginning of my liking Brunswick stew.

After my grandmother died, during my teens and later I would help my mom pick through the meat and add the vegetables. However, it was the one family recipe that I never made myself. As my mom was dying young of cancer, I was aware that Brunswick stew was one of the many things that I was losing. Jim Wilson's recipe may allow me to get that back. Our family would not consider the stew authentic without a squirrel or rabbit (preferably both) in addition to chicken and red meat (beef or venison). But I believe that by using Jim's recipe and what my mother taught me, I can reconstitute a family favorite. My mom was a good cook, so there will be lots of people — my dad, his friends, my husband and children — pulling for me. Many have volunteered to supply the game. My grandparents were originally from Granville County, so that might account for Jim's recipe seeming "about right" to me. Thanks for an article that puts "North Carolina" in *Wildlife in North Carolina*.

Tammy Jackson
Raleigh

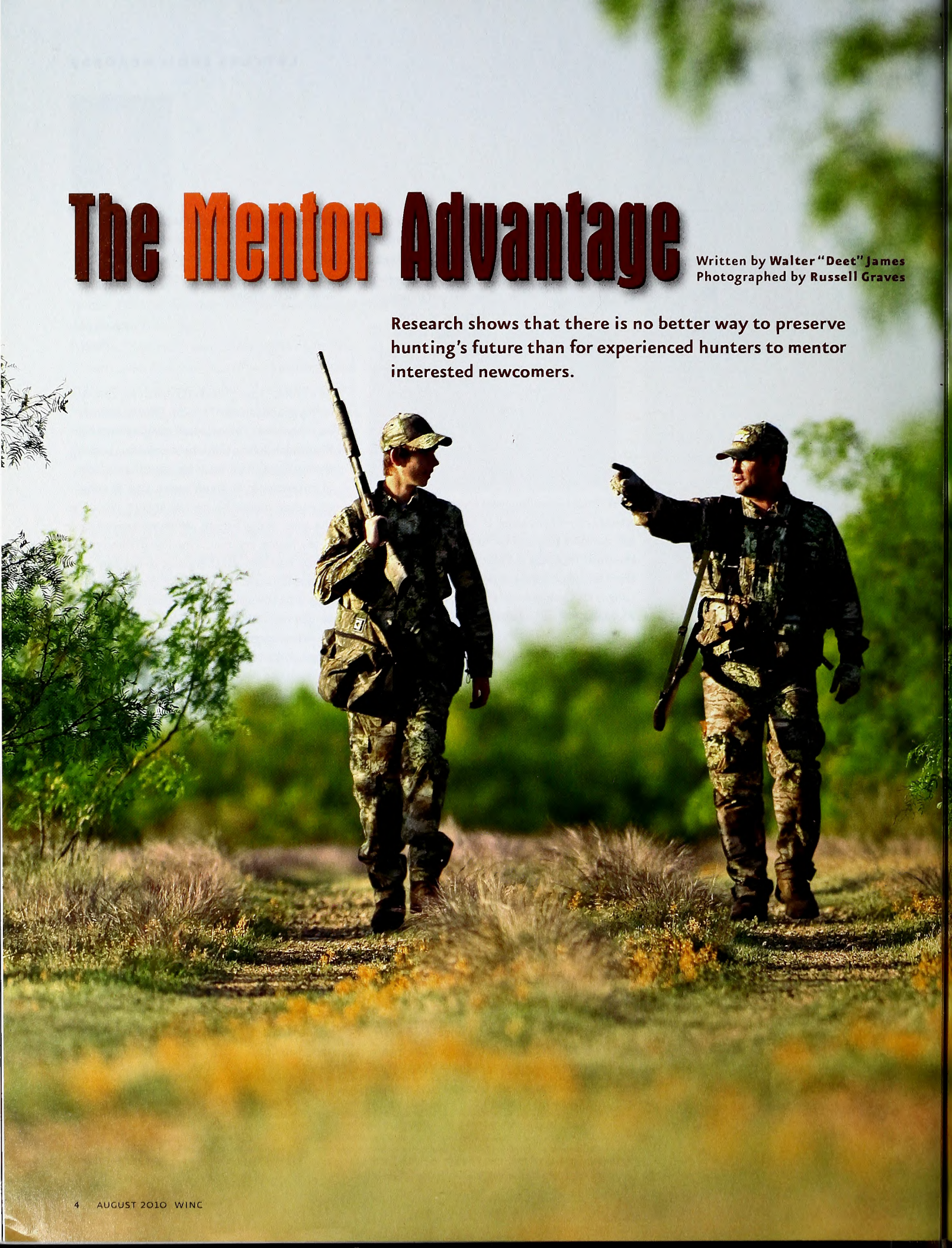
write us

Letters should be sent via e-mail to **letters@ncwildlife.org** *or through regular mail to Letters,* Wildlife in North Carolina *magazine, 1712 Mail Service Center, Raleigh, NC 27699-1712. Please include your name, address and daytime phone number. Letters chosen for publication may be edited for clarity and length.*

The Mentor Advantage

Written by **Walter "Deet" James**
Photographed by **Russell Graves**

Research shows that there is no better way to preserve hunting's future than for experienced hunters to mentor interested newcomers.



Thirty or forty years ago, finding a hunting mentor was like finding sweet tea, hushpuppies and banana pudding at the local barbeque restaurant—the hunting mentor was a staple on the cultural menu of life. Young children watched their older relatives go hunting; when they were deemed ready, the child joined the family hunting party. There was no need to search for a hunting mentor during a time when hunting represented a large part of the fabric of society. Hunting and the outdoors were a youth's rites of passage.

MENTORING AND THE MODERN DISCONNECT

Today we view a different picture. As Hunting Heritage Biologist with the N.C. Wildlife Resources Commission, I have attended youth conservation field days, youth hunts, Becoming an Outdoors-Woman courses and Boy Scouts of America Trailblazer events. I met a great many dedicated and compassionate individuals who sacrifice time and money so our youth can experience nature. Most were hunters. For those who were not, I asked them why. I discovered a few common themes in their answers:

- I never hunted, but have been interested in hunting.
- No one ever hunted in my family.
- None of my friends ever hunted.
- I didn't know anyone who hunted so I never had the chance to start.

Research has indicated that starting hunting at an early age, whether through family members or friends, increases the chance of developing a personal and cultural identity as a hunter. It can also mean the difference between premature desertion or developing a lifelong commitment to hunting.

A project by The National Shooting Sports Foundation and The International Hunter Education Association in 2000 provided some insight relative to hunter participation and continuation. Facilitators used a think tank type of approach to develop recommendations for increasing hunting and shooting participation, as well as to understand issues related to hunter recruitment and retention. Part of the project included developing a classification system to comprehend the various stages of hunter adoption or involvement. Although there were eight individual stages discussed, four are important for this discussion. They include 1) awareness, 2) interest, 3) trial and 4) continuation/adoption.

The awareness stage represents a person who knows that hunting exists. Once aware, there is a possibility that the person might become interested in hunting (i.e., interest stage). If that interest goes a step further, a person might move to the next stage and give hunting a try. Finally, once they have experienced hunting, a new hunter can continue the activity (continuation/adoption), desert the activity altogether or fall somewhere in between.

The social support of a hunting mentor can impact all stages of involvement, but it is most critical for the continuation/adoption stage. New hunters who lose the social support of mentors and other hunting companions have a greater chance of deserting than those who retain support. For many people, hunting contains a valued social component that can be as important as the actual hunting itself.

THE VALUE OF THE HUNTING MENTOR

If the social aspect of hunting is so important, can a person become a hunter without the support of other hunters? Nowadays, the Internet provides endless information about hunting. If that's not enough, there are hunting video games

and an array of hunting shows on TV and DVD. Information about hunting can also be found through federal and state wildlife agencies, nongovernmental organizations (NGOs), private shooting clubs and a variety of electronic social media including blogs, tweets, message boards and chat rooms.

For the independent, self-reliant, do-it-yourselfer, it is indeed possible to become a hunter without the assistance of an experienced mentor. According to research, however, sheer will alone might not suffice.

Responsive Management is an internationally recognized public opinion and attitude survey research firm specializing in natural resource and outdoor recreation issues. In a recent survey of more than 5,000 people — hunters and nonhunters alike — active hunters were asked, "Who first took you hunting?" The majority of active hunters were introduced to hunting by fathers (68 percent), friends (8), grandfathers (7), spouses (6) and uncles (6). Only 2 percent of active hunters first went hunting alone. This research supports the value of the hunting mentor. Once a person becomes an experienced hunter, they sometimes might choose to hunt alone. However, individuals rarely begin hunting on their own.

There are additional advantages for those recruited into hunting by a mentor. For example, my hunting mentor provided me with some of the basics needed to get started. Although my parents purchased my firearm, my uncle provided my license, clothing, ammo, food, transportation and the most important aspect — hands-on experience. For a young person who wants to hunt but comes from a nonhunting family, there is no equipment to borrow and no experience available. Even for the working adult, hunting start-up costs can be a deterrent. Some hunting mentors might be willing to share their equipment with a newcomer. Then, if the new hunter decides to make equipment purchases, the mentor can provide suggestions and recommendations. This way allows a social and material "try before you buy" advantage not afforded to the do-it-yourselfer.

FINDING A HUNTING MENTOR

Electronic information resources can benefit both the hunting mentor and interested nonhunter in locating each other. Many NGOs have websites advertising their own mentoring programs, while still others promote various youth and family outdoor events and hunting opportunities. Initiation into these events often can be accomplished through a simple registration form and/or the cost of membership in some cases.

Even if someone is not seeking a hunting mentor initially, the opportunity to meet and talk with people who hunt can help provide knowledge and insight about becoming a hunter. The main advantage to these organizations and events is that they provide the social camaraderie and club atmosphere by offering places to go, a support base of mentors, and topics of mutual interest to discuss.

Federal and state agencies are different in that they are primarily resource-based entities with the ability to connect people to resources. However, they do not have the capacity to provide the social component that shooting clubs and NGOs offer. The one exception is through hunter education. Hunter education is not only a mandatory prerequisite to hunting, it provides an opportunity to network with existing hunters. Many dedicated hunters volunteer as hunter education instructors, and all have the ability to offer a wealth of information and guidance to the beginner. Signing up for a free hunter education course is a great way to get started.

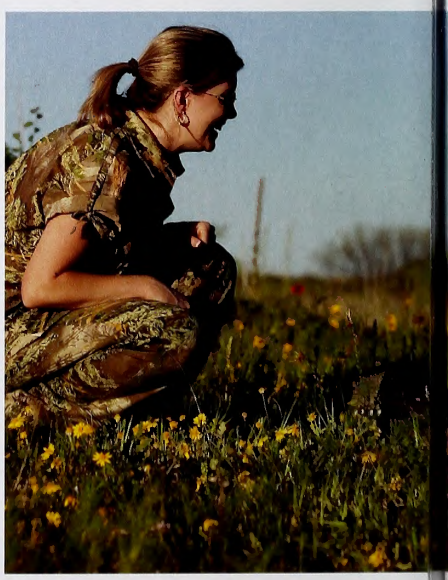
Another option for individuals seeking hunting information is to participate in some of the various annual outdoor conservation events mentioned earlier. These are great ways to network with hunters, and it doesn't necessarily cost anything to get involved.

BECOMING A HUNTING MENTOR

For those interested in becoming a mentor, sharing the hunting tradition with someone new can be a rewarding experience. Mentoring provides an opportunity to preserve the legacy for future generations. Moreover, hunting provides so many unique memories worthy of sharing that not doing so seems selfish by comparison. Finding out what motivates hunters to become mentors is critical if we are going to address the slow demise of newcomers into hunting.

Try to imagine a day when hunting would cease to exist, when hunter numbers became so small that society decided that hunting doesn't matter anymore. Funding for wildlife

MELISSA McGAW/NCWRC



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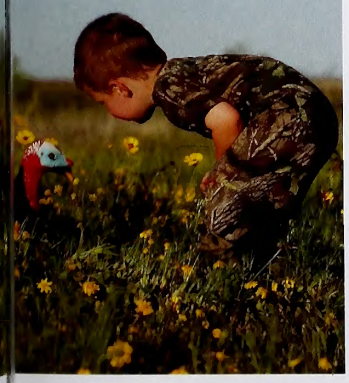
People of all backgrounds, ages and abilities are potential hunters. The common thread that runs though the activities pictured here is experienced hunters spending time with newcomers, whether in the field, on the shooting range, in a hunter education class, at a hunt club, or becoming familiar with hunting gear such as decoys.



management and conservation would diminish, and hunters would no longer have a vote because we allowed our numbers to dwindle. The hunter's voice would be silenced by attrition. The question becomes, What really motivates an individual to become a hunting mentor?

In 2008, Responsive Management asked active hunters, "Why did you take someone hunting?" Answers were as follows:

- (44%) Showed interest in learning the sport / asked me to take him or her.
- (16%) Wanted to share my experience and /or enjoyment of the sport.
- (11%) For fun, enjoyment and/or recreation.
- (11%) To introduce the sport / to encourage interest in the sport.
- (9%) Family tradition / want to continue hunting heritage.
- (5%) It is important to learn gun safety, self defense, and/or how to shoot.
- (4%) Companionship.

Based on this survey, the greatest motivation for mentoring was the fact that someone showed an interest in the activity. Many lifelong hunters often emphasize "preserving the heritage" for future generations as a motivating factor for getting involved as a mentor. However, it also requires the interest and request by the newcomer to complete the process. For someone interested in hunting for the first time, this research is welcoming and suggests that a valuable resource is there for the asking.

Mentoring has become much more of a challenge in our modern world of nature disconnection. Outdoor interest in young people has been all but phased out in a world of computers, iPods and video games. If our next generation of hunters is truly disconnected from nature, and therefore hunting, perhaps we need to reconnect them. In his book "The Hunter: Developmental Stages and Ethics," Bob Norton provides some interesting insight into this challenge: "Before we put kids in the duck marsh or the tree stand, we need to get them into the woods, teach them about nature, let them explore and use their own imaginations," and further, "We need to spend more time with them in the outdoors, one on one, answer their questions, and teach them to respect wild animals and their habitats."

Although the excitement and enjoyment of the hunt itself may be the ultimate goal for some, we may be lacking in teaching the prerequisites necessary for developing a lifelong hunter. This way, the interest, respect and appreciation for the outdoors develops first.

TRY TO IMAGINE A DAY WHEN HUNTING WOULD CEASE TO EXIST, WHEN HUNTER NUMBERS BECAME SO SMALL THAT SOCIETY DECIDED THAT HUNTING DOESN'T MATTER ANY MORE. FUNDING FOR WILDLIFE MANAGEMENT AND CONSERVATION WOULD DIMINISH, AND HUNTERS WOULD NO LONGER HAVE A VOTE BECAUSE WE ALLOWED OUR NUMBERS TO DWINDLE. THE HUNTER'S VOICE WOULD BE SILENCED BY ATTRITION.

MENTORING IS A LEARNING PROCESS

Going hunting yourself is one thing—teaching someone new about hunting is another. Looking back, I don't remember a great deal of instruction from my hunting mentor. That's not to say it didn't happen. I do vaguely remember my first gun-deer hunt, though. My Uncle Bill and I walked into the predawn darkness on a late November morning in 1972. I was carrying Bill's 12 gauge pump shotgun. I was on stand well before first light. Uncle Bill placed me next to a tree, told me to be quiet, not to move, and said he would be close by "just in case." He then moved about 20 yards away from me, stood next to a tree, and became silent.

Not long after first light, a young spike buck walked slowly behind me. I froze. I was disappointed that I had lost an opportunity at taking a legal buck on the first day of the season. Uncle Bill never made a big deal of it. We left the woods around noon for lunch and recounted the "missed deer" story over and over that day. Uncle Bill knew there would be other chances, and deep down, so did I.

The point is that the new hunter is not only clueless as to the entire hunting experience, but also to the mix of emotions that occur at that first opportunity to take a game animal. Keeping a hunting trip relaxed, and expectations to a minimum, is important when introducing someone to hunting.

As an avid hunter, I do not consider my hunts casual. I take my hunting very seriously and do not leave my hunting area until I've harvested game or shooting light has passed. I've known many like-minded hunters. Not even severe weather, insects, lack of food and water, or the threat of repercussions from family members can remove some of us from our woodland sanctuary until it's time.

If, however, we decide to provide the gift of mentoring to some interested newcomer, it might be a good idea to tone it down a bit, at least for the first few outings. The new hunter is likely unprepared for a Jeremiah Johnson-type "mountain man" adventure and may never hunt again if subjected to one. Focus on the new hunter's needs for the time being rather than your own. Altering personal hunting methods temporarily could mean the difference between an enjoyable outing versus a nightmarish one-time experience.

IT'S PERSONAL

All dedicated hunters, regardless of generation or age, have come to a crossroads which we cannot afford to ignore. Each year, hunters represent a smaller proportion of the population overall. Our youth will not automatically reconnect with nature, nor will our society revert back to the good old days of hunting. Times have changed.

Making connections with people takes time and effort. No silver bullet is necessary—we already have what we need. For those thinking about mentoring someone, take a moment and think back to one of your best frosty fall mornings as you watched the sun rise, the taking a of fine game animal after weeks or months of preparation, or the relaxed feeling after a hard day's hunt while you eagerly anticipated the next. Become a hunting mentor this season, because the future of hunting is personal.

Walter "Deet" James is the Hunting Heritage Biologist for the N.C. Wildlife Resources Commission's Hunting Heritage Program.

ADVICE FOR MENTORS

Mentoring a new hunter can be accomplished by simply inviting someone new to hunting on your next outing. Keep the following in mind:

Focus on the new hunter's needs first: It's easy for the passionate hunter to become engrossed in the seriousness of the hunt. Relax and try to remember your first hunt and the overwhelming newness of it all. Slow down and spend time explaining and sharing rather than expecting. Stay together for the first few outings to provide on-the-spot guidance.

Be safe: Discuss and practice safe gun handling and tree stand safety prior to the hunt and routinely throughout.

Limit expectations: It is easy to take for granted the knowledge and experience accumulated over many years. Understand that the new hunter has not had that privilege of time and experience.

Easy does it: You may be able to walk for miles in rugged terrain with a backpack all day long. Trying to impose that method on a new hunter, youth or adult, may discourage them from ever going again. Instead, make the initial outings interesting, enjoyable, educational and relaxed.

Fits and starts: Be sure the new hunter has the clothing and the necessary hunting equipment to get them started. Whether in warm or cold temperatures, make sure the new hunter remains comfortable. Being considerate of the new hunter's comfort can make the outing more enjoyable and rewarding.

Full tank: Breakfast is the proper start to any day afield, and be sure the new hunter has plenty of snacks and water — especially young hunters.

ADVICE FOR THOSE BEING MENTORED

For a nonhunter interested in hunting, the best way to find a mentor is to begin meeting hunters. Ask a friend or family member who hunts, visit a local hunting or shooting club, or attend a free hunter education course. According to research, hunters tend to respond willingly to those interested in learning their passion. If you do find someone willing to mentor you, keep these things in mind:

Be prepared: Although becoming a new hunter can be somewhat overwhelming, a little research into the activity prior to the first outing is recommended. Doing your homework prior to a hunting or shooting activity displays your level of interest and may be greatly appreciated by the mentor. Much can be discovered about hunting at www.ncwildlife.org.

Be safe: A newcomer must understand basic firearm and tree stand safety, the importance of hunting regulations and the need to identify the target before shooting. Sign up for a free hunter education course at www.ncwildlife.org

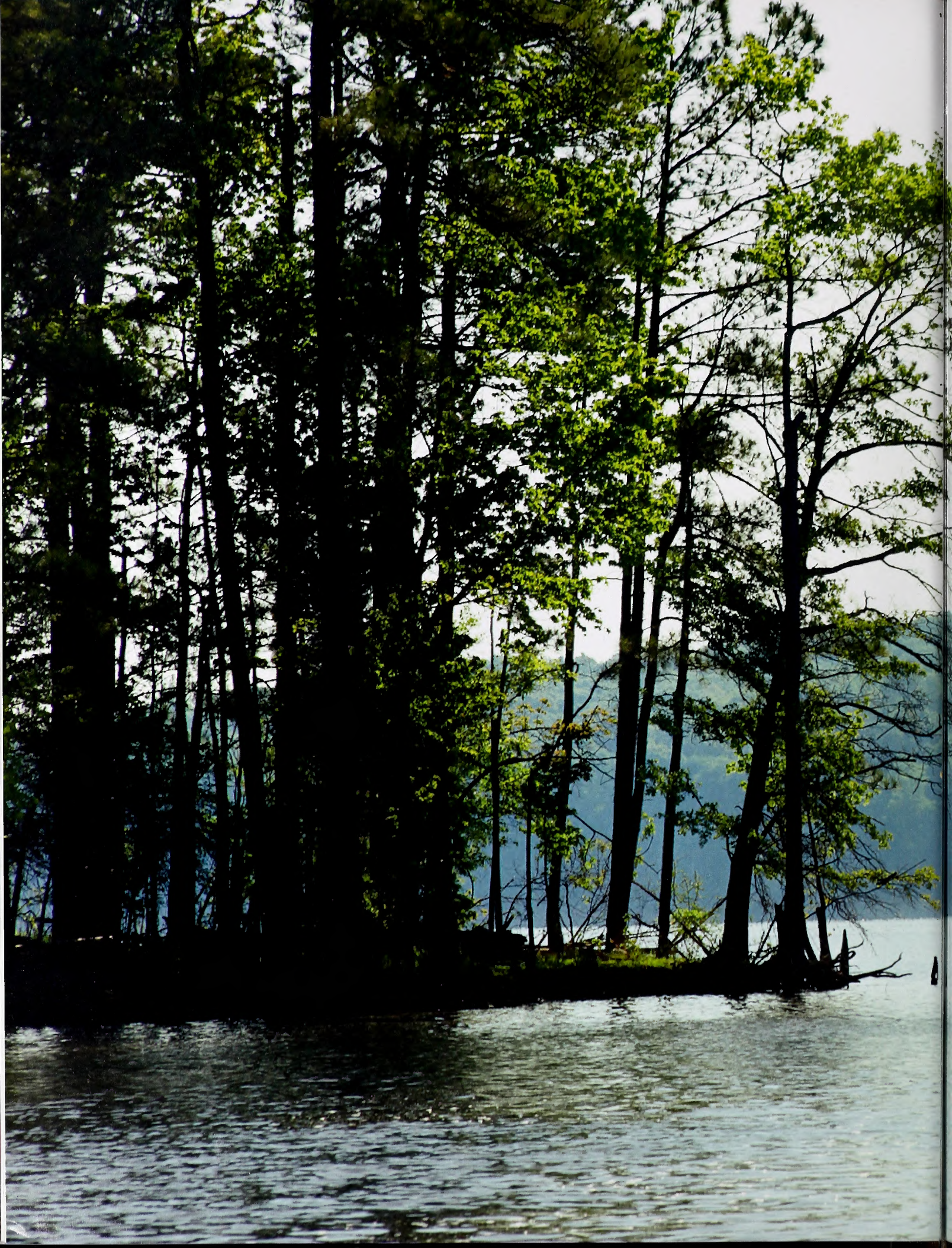
Be on time: Hunting involves a distinct timeline, and although not always critical, should be adhered to. Avoid making your mentor wait for you.

Be polite: Show your hunting mentor your interest by listening, learning and remaining respectful. It could mean the difference between gaining a new hunting companion and a one-time outing.

Be appreciative: Mentoring is the ultimate outdoor gift. Showing appreciation for it is welcomed. If you can afford it, offer to buy a meal or gasoline. Doing so is a good way to say thanks to the mentor.

To access a list of shooting organizations, visit www.ncwildlife.org.

- Click on the "Hunting" link on the left side of the screen.
- Scroll down the hunting page to "Other" in the center column.
- Click on Shooting Range Opportunities in NC (Public and Private).



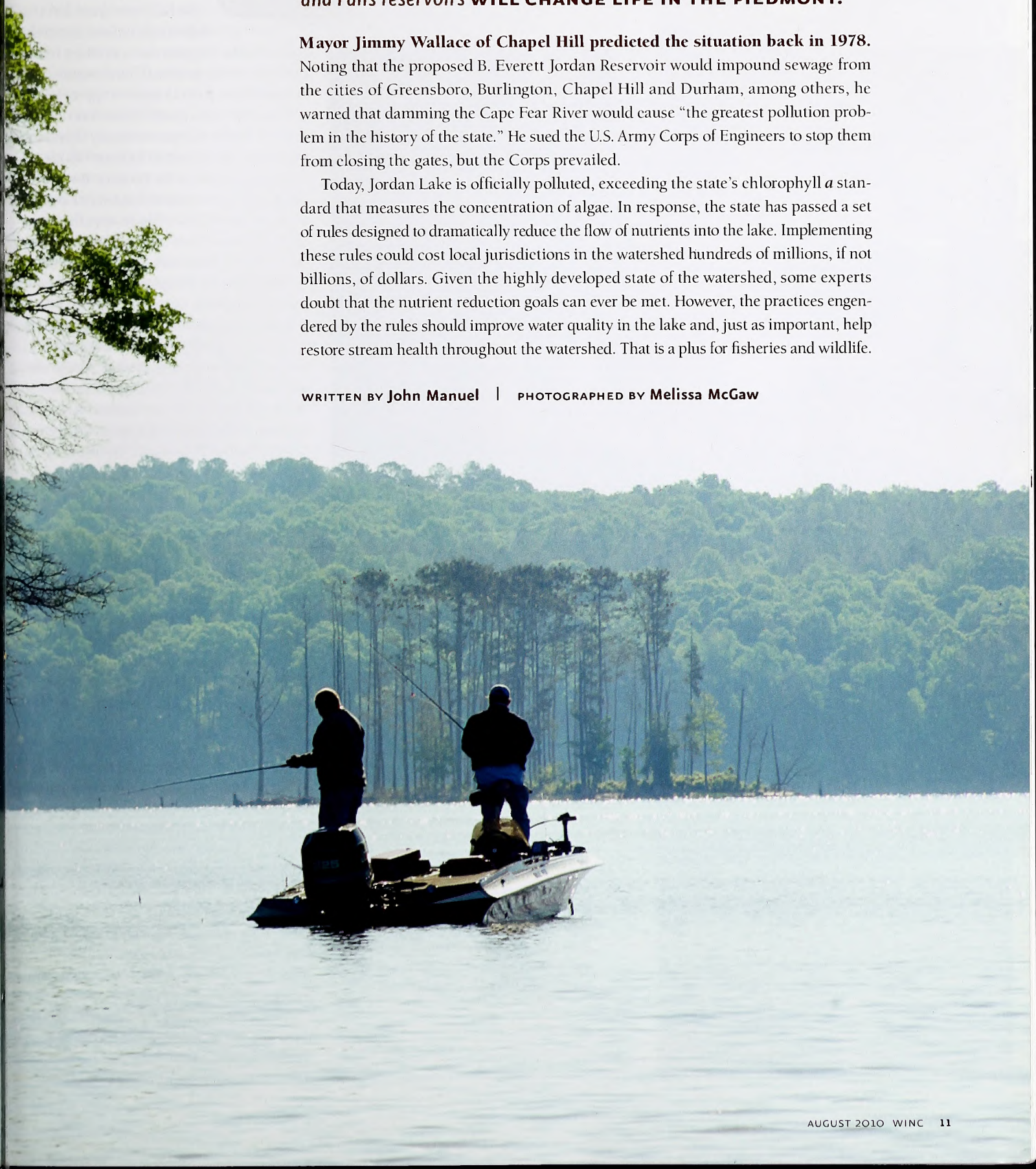
THE JORDAN RULES

NEW REGULATIONS *to reduce nutrient concentrations in Jordan and Falls reservoirs* **WILL CHANGE LIFE IN THE PIEDMONT.**

Mayor Jimmy Wallace of Chapel Hill predicted the situation back in 1978. Noting that the proposed B. Everett Jordan Reservoir would impound sewage from the cities of Greensboro, Burlington, Chapel Hill and Durham, among others, he warned that damming the Cape Fear River would cause "the greatest pollution problem in the history of the state." He sued the U.S. Army Corps of Engineers to stop them from closing the gates, but the Corps prevailed.

Today, Jordan Lake is officially polluted, exceeding the state's chlorophyll *a* standard that measures the concentration of algae. In response, the state has passed a set of rules designed to dramatically reduce the flow of nutrients into the lake. Implementing these rules could cost local jurisdictions in the watershed hundreds of millions, if not billions, of dollars. Given the highly developed state of the watershed, some experts doubt that the nutrient reduction goals can ever be met. However, the practices engendered by the rules should improve water quality in the lake and, just as important, help restore stream health throughout the watershed. That is a plus for fisheries and wildlife.

WRITTEN BY **John Manuel** | PHOTOGRAPHED BY **Melissa McGaw**



Water samples from other large reservoirs average around 10,000 units [of algae] per milliliter. ***Jordan's samples regularly exceed 100,000.***

MARK VANDER BORGH

Jordan Lake polluted? The angler who has just hauled a 5-pound bass from the lake may question that definition. Indeed, experts say Jordan Lake supports an excellent fishery, not only for largemouth bass but also for striped bass, hybrid bass, crappie, bream, catfish and white perch. There's no evidence that the forms of algae currently found in the lake pose any threat to human health, nor are they a problem for boaters. But Jordan Lake does have concentrations of algae far above those of other big reservoirs in the state, and that does not bode well for the lake over the long term.

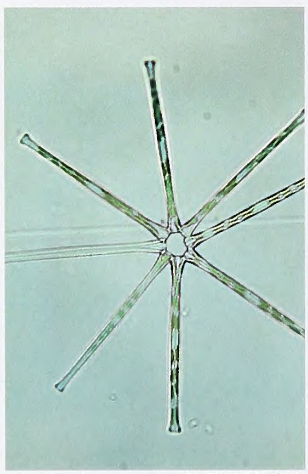
Mark Vander Borgh is the biologist with the N.C. Division of Water Quality (DWQ) who has been tasked with defining the algae situation in Jordan Lake. Surrounded in his lab by aquariums your mother would chide you to clean, Vander Borgh describes the role that algae play in the ecosystem. "Algae form the base of the food chain in our streams and lakes," Vander Borgh said. "Without it, the lakes would be sterile. But when concentrations become high, they can pose a threat to fish."

Vander Borgh displays a photograph taken through a microscope of a water sample from Jordan Lake. It looks like a blizzard with dozens of kinds of algae and diatoms crowding the image. "Jordan Lake is a phytocological wonderland," Vander Borgh said. "Water samples I've taken from other large reservoirs average around 10,000 units [of algae] per milliliter. Jordan's samples regularly exceed 100,000."

During daylight hours, algae produce oxygen through the process of photosynthesis. At night, photosynthesis shuts off, causing oxygen levels to drop. This also causes fluctuations in pH and carbon dioxide levels. If these fluctuations are high enough, fish in the surrounding water become stressed and may even die. "Those conditions may have resulted in a fish kill in March of 2006," Vander Borgh said. "We can't know for sure. Fish can die [en masse] for a number of reasons, and there's no easy way to determine the cause."

Vander Borgh said the algae found in Jordan do *not* include the mat form that people frequently see covering the surface of ponds. Rather, the algae in Jordan are primarily

MARK VANDER BORGH



MARK VANDER BORGH

MARK VANDER BORGH

Mark Vander Borgh (here with colleague Elizabeth Fensin) is tasked with defining the algae situation at Jordan. Among the microscopic plants living in the lake are (left to right): filamentous blue-green algae, the diatom asterionella and an assemblage of various algal species.

blue-green varieties that hang suspended in the water column. Though they can be eaten by aquatic organisms, blue-greens are not a preferred food source. And they can create problems for suppliers of drinking water.

Kelvin Creech is manager of the Cary/Apex water treatment plant, which draws drinking water from the New Hope Creek arm of Jordan Lake. Creech says that all algae have some taste, but blue-greens are particularly malodorous. When these are in bloom, the treatment plant must take costly steps to neutralize the taste and odor. Further, excessive algae can clog the plant's filtration system. That forces operators to "backwash" the filters, a process that involves discharging water back into the lake and pumping an additional amount as makeup water. That, too, is an additional expense and a waste of energy.

"We do our own algae identification and enumeration, looking for types that we know will create taste and odor problems," Creech said. "As populations start increasing, we know we need to prepare for additional treatment. 2009 was the worst year I can remember, and I've been working at the plant since 1996."

In fact, Jordan Lake began experiencing problems with algae all the way back in 1983, the year the gates were closed. Jordan has consistently exceeded the state's chlorophyll *a* standard of 40 milligrams per liter for surface reservoirs and lakes. Conditions have been especially troubling in the Upper New Hope arm, which receives a high volume of nutrients from three waste treatment plants and a variety of "nonpoint sources" such as parking lots, streets, subdivisions and farms. The Upper New Hope arm is shallow, and water has a long residence time owing to the Fearrington Road causeway, which acts like a bottleneck, restricting the flow of water to the southern part of the lake. These conditions are especially conducive to algae growth.

The state first declared the reservoir a Nutrient Sensitive Water in 1983 and required waste treatment plants in the watershed to reduce their phosphorus outputs. But there was no formal effort to control the nutrients coming from nonpoint sources. Meanwhile, population in the watershed exploded. Local governments weren't about to restrict their own development for the benefit of some downstream water user, and the state legislature balked at taking meaningful action.

CITY OF DURHAM STORMWATER SERVICES

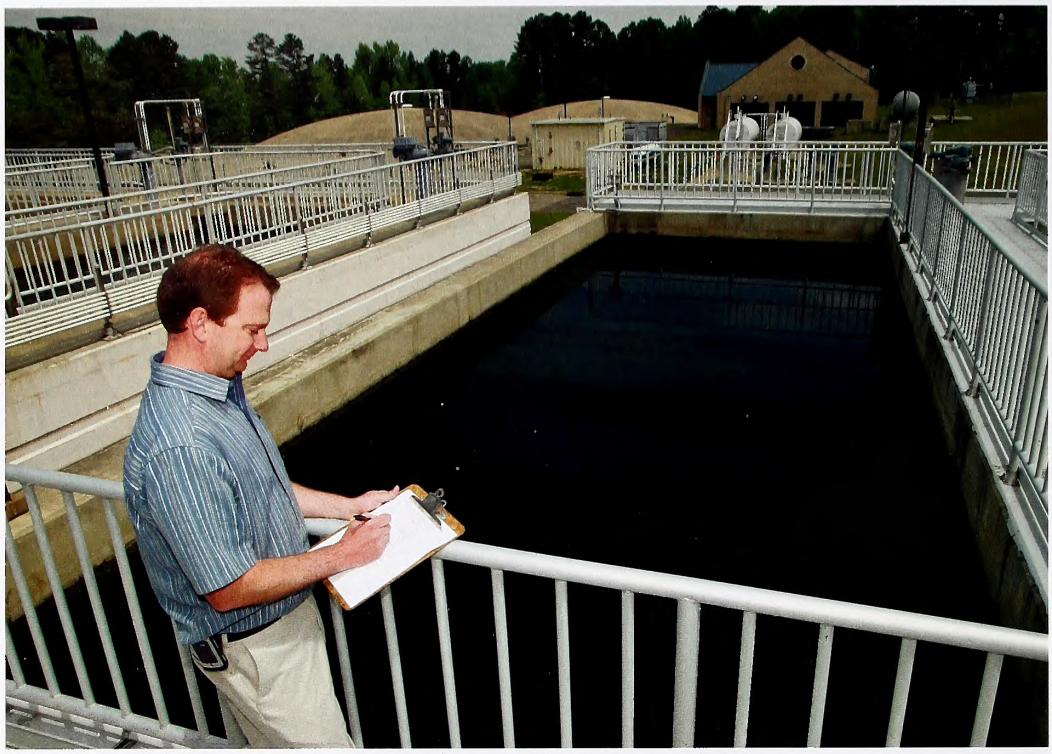
Retention ponds are becoming a common part of many new developments in sensitive areas. The ponds, low-lying areas planted in native vegetation, hold water for several days. The water leaves behind phosphorous and nitrogen which the plants absorb.

In 1997 the state passed the Clean Water Responsibility Act, requiring the Environmental Management Commission (EMC) to set both nitrogen and phosphorus limits on wastewater treatment facilities discharging to Nutrient Sensitive Waters, and to impose nutrient reduction goals on point and nonpoint sources. Over the next half-dozen years, consultants monitored and modeled the lake to determine the relative nutrient contributions from different sources (e.g., wastewater plants, development and agriculture) and to estimate the nutrient-loading reduction needs required to achieve nutrient-related water quality standards.

Beginning in 2003, the DWQ conducted an 18-month process in which stakeholders—local governments, developers, state and federal agencies, environmental groups—met to seek a consensus on nutrient-loading goals, discharge allocation methods and a conceptual nonpoint source strategy. Draft rules were published in 2007 and public hearings held in different locations in the watershed. The meetings were contentious, with stakeholders wrangling over a variety of aspects, most notably the degree and time frame of nutrient reduction goals for existing development.

After numerous revisions, the EMC adopted the rules in 2008, and they were passed into law by the General Assembly in 2009. The final rules set nutrient reduction goals for each of three hydrologically distinct arms of Jordan Lake. The goal for the Upper New Hope arm is a 35 percent reduction in nitrogen and an 8 percent reduction in phosphorus relative to a baseline of 2001. The goal for the Haw River arm is an 8 percent reduction in nitrogen and a 5 percent reduction in phosphorus. The goal for the Lower New Hope arm is to match the 2001 baseline year.

To achieve these reductions, the rules set stringent limits in terms of pounds per acre of nitrogen and phosphorus allowed from different sources (e.g., waste treatment plants, new development, existing development and agricultural lands). Local governments



Excessive concentrations of algae can be costly for municipalities. Kelvin Creech, manager of the Cary/Apex water treatment plant, says that when blue-green algae are in bloom, his facility must take extra steps to neutralize the taste and odor caused by the plant. Although Jordan Lake is considered "polluted," the algae do not affect the lake's thriving fisheries (opposite).

have the responsibility for designing methods of reaching these limits. Citizens will bear the cost.

What will these rules mean for residents of the Jordan Lake watershed? With respect to new residential and commercial development, developers will be required to install Best Management Practices (BMPs) designed to reduce and/or slow stormwater runoff. For any given development, multiple BMPs may be required. These work best when installed in sequence.

The first line of defense is to slow the flow of rainwater from hardened surfaces. This might be accomplished with technologies sueh as green roofs, cisterns and porous pavement. Stormwater can then be channeled to a bioretention (or bioremediation) cell, a low-lying area planted in natural grasses and shrubs on top of loamy soil, and often with an underdrain to keep water from ponding for more than a couple of days. Stormwater is slowed as it percolates through this medium and leaves behind phosphorus and nitrogen, which bind to the soil and are absorbed by the plants. Third in line are stormwater wetlands. These "mini-swamps" are designed to hold water over a matter of days or weeks, allowing for further slowing of runoff and trapping of nutrients and sediment.

Frank Thomas, director of government relations for the Home Builders Association of Durham, Orange and Chatham Counties, says the requirement for BMPs will make it "significantly more expensive" to build new homes in the watershed. "Residential communities will also be higher density in order to make room for BMPs," he said.

Theoretically, smartly designed bioremediation cells and stormwater wetlands could provide open space for residents and habitat for a variety of birds, reptiles and amphibians. (A good example are the BMPs installed beside the N.C. Wildlife Resources Commission's headquarters in Raleigh.) However, many subdivisions fence off these ponds to avoid liability for an accidental drowning.

Existing developments pose a much greater challenge when it comes to reducing nutrient loads. There is simply not room in most urban environments to put in the sequential BMPs mentioned above without tearing out buildings and/or streets and parking areas. Owing to the difficulties and untested nature of reducing nutrients from existing development, DWQ has adopted a two-stage program for that sector. Stage 1 calls for educating the public regarding ways to reduce nutrient loading. Actions residents can take include applying less fertilizer to lawns and gardens, containing pet waste and reducing driving (because atmospheric deposition of nitrogen is a major source of harmful nutrients in the Triangle).

Stage 1 will also include an effort to identify leaky septic systems and get them hooked up to city sewers, and an effort to promote the maintenance of existing BMPs. Many newer developments already have stormwater retention ponds, but unless these are regularly maintained, they fill up with silt and clay and their performance as nutrient and sediment filters declines.

If monitoring data shows that Stage 1 measures are not meeting water quality standards for the lake, local governments must devise more stringent measures for existing development. This determination will be made by 2014 for the Upper New Hope arm and by 2017 for the Haw and Lower New Hope arms.

In the agricultural sector, local governments will work with farmers and livestock owners to preserve and increase vegetative buffers around streams, to practice no-till agriculture, and to avoid overapplication of fertilizers. State rules require that commercial applicators applying fertilizer for any of a host of land uses (e.g., croplands, horticultural farms, golf courses) must complete a nutri-

ent management course to understand the importance of proper management of nitrogen and phosphorus.

The Jordan Rules require that vegetative buffers be maintained within 50 feet of all streams in the watershed, both intermittent and perennial, as well as lakes and ponds. The first 30 feet must be kept as undisturbed vegetation. Limited uses are allowed in the second 20 feet. Intended as a method for filtering nutrients from the adjoining land, the buffers will provide some wildlife habitat and will help prevent sedimentation and warming of streams.

Will implementation of all these technologies and practices work?

"I do not know enough about the limits and reductions to give a definite answer," said Vander Borgh. "I do know that whatever the effects are, they will not be immediate. The nutrient cycle is complex; they [nutrients] can be sequestered for a time, only to be released when plants and animals die and decompose. I can say that reducing nutrients will keep algal productivity from increasing."

Following on the heels of the Jordan Rules will be a similar set of rules for the Falls Lake watershed. Falls Lake provides drinking water for the City of Raleigh, and plant operators are facing problems similar to those of the Town of Cary with respect to taste and odor due to excessive algae. DWQ officials state that the nutrient reduction goal for Falls will be even greater than for Jordan—40 percent of nitrogen and 77 percent of phosphorus from the baseline year of 2006.

As in the Jordan watershed, stakeholders in the Falls watershed, including the cities of Durham, Hillsborough, Butner and Creedmoor, are concerned about the cost and time frame for achieving these goals. The state's latest estimate for cleaning up Falls Lake is $1.5 billion, with most of that cost borne by local governments. Experts are likewise concerned about whether the goals can be met for the lake, particularly the nutrient-laden Ellerbe Creek arm. Public hearings have been ongoing. Adoption of the final rules is scheduled for January 2011.

Uncertainties notwithstanding, experts agree that efforts to lower nutrient loads in Falls and Jordan must be made. Water quality in both lakes is headed downhill, and dramatic changes in development patterns and, to a lesser extent, agricultural practices are needed to reverse the situation. If these are wisely executed, benefits will extend beyond the two reservoirs and will encompass more than just nutrients.

MARK VANDER BORGH

Uncertainties notwithstanding, experts agree that ***efforts to lower nutrient loads in Falls and Jordan must be made.***

Lisa Creasman of the Conservation Trust for North Carolina believes the rules could provide an added incentive for a variety of organizations and agencies to work together to achieve mutual goals. "Considering the ecosystem services provided by land conservation and sustainable lands management, the ongoing work of the land trusts and natural resource agencies to preserve natural areas and working lands will contribute to maintaining if not improving water quality and quantity in the Upper Neuse River basin," she said. "It's our hope that as regulators and local governments design and implement strategy for the Falls Lake Rules, they will recognize the value of including land conservation."

William Hunt, professor of biological and agricultural engineering at N.C. State University, believes the rules will help restore the function of ephemeral streams, those that run only part of the year but play a vital role in ecological health. "As soon as you pave over an area, you speed up the flow of water, and streams that were ephemeral just become ditches, "Hunt said." They run maybe 30 percent of the time, where before they may have run 70 to 90 percent of the time. Stormwater BMPs will improve water infiltration and lead to more appropriate recharging of streams and aquifers."

"Dirty water gets to the lake via dirty creeks, and every city suffers from these," said Elaine Chiosso, executive director of the Haw River Assembly. "The beauty of these rules is that in the process of reducing the nutrient pollution in stormwater runoff to Jordan Lake, we will be reducing all water pollution. These rules will reduce sediment, heavy metals and other pollutants that run off the land into our streams during storms. We'll be doing the things to protect water that we should have been doing all along." ◆

John Manuel is a freelance writer living in Durham, and a regular contributor to Wildlife in North Carolina.

APACHE JUMPING SPIDER (*Phidippus apacheanus*)

Jumping spiders make up the largest family of spiders with more than 5,000 species recognized worldwide. This tiny species is one of North Carolina's most colorful spiders.

Portraits of Diversity

PHOTOGRAPHED BY TODD PUSSER

INVERTEBRATES

North Carolina contains the most biodiversity of any temperate region in the world. This series highlights the unique diversity of life found within our state's borders, photographed against neutral backgrounds to emphasize each species' individual characteristics.

Most animal life in North Carolina is small. Nine out of 10 animals found within the state are smaller than your fingernail. Everywhere you look, invertebrates dominate the land, air and sea. From my front porch light to the longleaf pine savannas of the Sandhills, from the top of Mount Mitchell to the sandy ocean bottom off Cape Lookout, invertebrates—those animals lacking backbones—are all around us. Many people find creatures such as insects repulsive, or live in constant fear of spiders and jellyfish. Few understand that the health of our state's natural heritage depends on the lives of its smallest organisms. From pollination of native plants and cash crops to seed dispersal, filtration of our freshwater streams to soil production, waste removal to providing food for others, invertebrates sustain life as we know it in our state.

The diversity of invertebrates found in North Carolina is so great that no single magazine article can offer more than the briefest glimpse of what roams our land and swims our state's waters. For the purpose of this feature, I trained my camera lens on invertebrates that occupy our land, freshwater streams and ocean. Some you may be familiar with, others you may not. Each invertebrate was photographed against a neutral black or white background. The purpose of this type of photography is to celebrate the beauty and texture of each creature without any distracting background elements. Your eye is forced to concentrate on the details, such as the hind leg of a field cricket or large eyes of a jumping spider.

My hope with this feature is that the images will inspire you to take time from your busy day to stop and get down on your knees. Better yet, get your son or daughter to join you. It can be in your back yard or a neighborhood park. Flip over a rock in the stream or turn over a log in the woods. In no time at all you will find some of the spineless wonders that make life in North Carolina so remarkable.

–Todd Pusser

CAROLINA LADLE CRAYFISH
(Cambarus davidi)

North Carolina boasts an impressive diversity of crayfish with over 40 species recognized, including this endemic species. More than just fish bait, crayfish are good indicators of water quality.

YELLOW LAMPMUSSEL
(Lampsilis cariosa)

Freshwater mussels provide a very important biological service, filtering bacteria and particles from the water. Unfortunately some mussels are among the most endangered animals in North America due in large part to dams, invasive species and toxic runoff.

FRESHWATER GRASS SHRIMP
(Palaemonetes sp.)

Readers may be surprised to learn that several species of shrimp are found in freshwater rivers throughout North Carolina. This specimen is from Puppy Creek in Hoke County.

HORSESHOE CRAB (*Limulus polyphemus*)

Horseshoe crabs are "living fossils," having been on this planet for over 450 million years. Despite their name, they are more closely related to spiders and scorpions than to crabs.

MOON JELLYFISH (*Aurelia aurita*)

One of our most abundant jellyfish species, the moon jellyfish's sting is only mildly toxic and causes a slight itchy rash.

KEYHOLE SAND DOLLAR (*Mellita quinquiesperforata*)

The skeletons of these echinoderms are favorites among shell collectors. Living specimens are brown and densely covered in fine spines.

NATURE'S WAYS

How Do Insects Molt Their Exoskeletons? See Nature's Ways, page 39.

BESS BEETLE (*Odontotaenius disjunctus*)

Turn over a rotten log anywhere in North Carolina and you will likely find this species. Adults can reach two inches in length.

MISCHIEVOUS BIRD GRASSHOPPER (*Schistocerca damnifica*)

This is a common species of open fields and woodlots where it feeds on herbaceous plants. An Old World member of this family is the source of locust plagues mentioned in the Bible.

MILLIPEDE (*Sigmoria latior*)

As a self defense mechanism, this species releases hydrogen cyanide from pores along the sides of its body. Pick one up and your hand will smell like cherries.

MAGNOLIA GREEN JUMPING SPIDER (*Lyssomanes viridis*)

This is our state's most unusual-looking spider. Jumping spiders have the best eyesight of any arthropod. They are active hunters and do not spin webs.

SOUTHEASTERN FIELD CRICKET (*Gryllus rubens*)

On warm, muggy nights, step outside and you will hear this species' musical trill. It favors disturbed grassy areas.

CATALPA SPHINX MOTH (*Ceratomia catalpae*)

There are more moth species in the world than all birds, fish, mammals and reptiles combined — more than 12,000 in North America alone. This species flies from April to October and is readily attracted to porch lights.

HIEROGLYPHIC CICADA (*Neocicada hieroglyphica*)

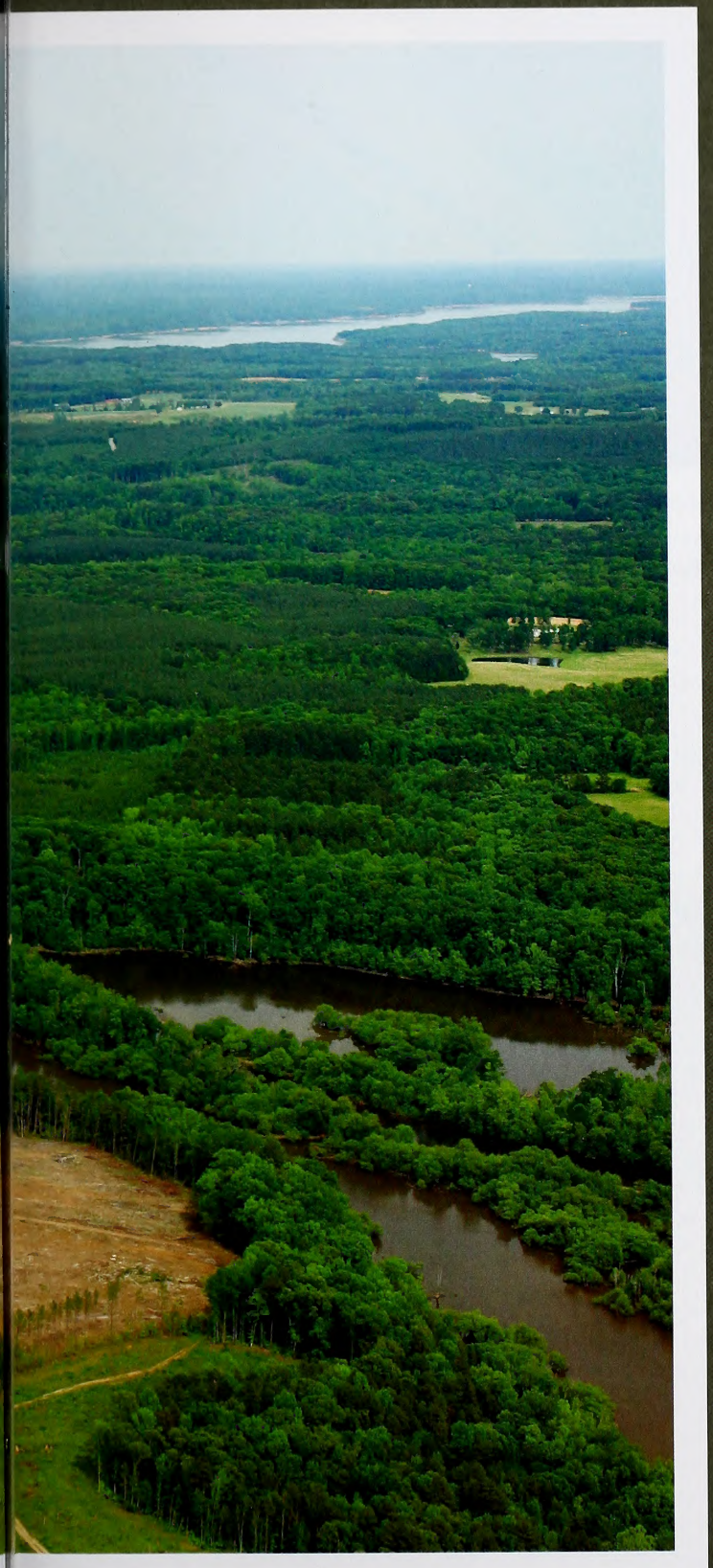
This species is found throughout the state. Its high-pitched drone can be heard in June and July, particularly late in the day and into the evening.

GRAPEVINE BEETLE (*Pelidnota punctata*)

One out of four animal species on the planet is a beetle. This colorful and nocturnal species is readily attracted to lights.

The Many Faces of the Dan River

Part 2



Conservation at the local level could be the key to preserving the beauty of the river.

Written by Bruce Ingram
Photographed by Melissa McGaw

Part I of this two-part series on the Dan River covered the stream from its headwaters in Virginia along the Blue Ridge Parkway to Hanging Rock State Park in Stokes County. For Part II, we'll look at the waterway from the park to Kerr Lake.

Hanging Rock State Park and Downstream

N.C. Wildlife Resources Commission fisheries biologist Kevin Hining says that he has floated and studied the Dan River from a few miles upstream of Hanging Rock to U.S. 311 near the Stokes-Rockingham county border.

"Personally," he said, "I think the section of the Dan between Hanging Rock State Park and Walnut Cove represents one of the nicest river portions in northwestern North Carolina. In short, it's a great smallmouth bass and redbreast sunfish river — definitely one of my favorite rivers in North Carolina. The scenery is spectacular, with numerous rocky bluffs.

"Most of the smallmouths I've caught have been in the 10- to 12-inch range, but we've always managed to catch a few 15- to 16-inch smallmouths on every float. The locals have told me 18-inch fish are not uncommon, but my fishing skills, or lack of, have yet to verify that."

Hining, a District 7 biologist, says that in the vicinity of the Stokes and Rockingham county line, anglers should expect to begin catching more largemouth bass, as the river transitions to a sandier, low-gradient stream. Smallmouths can still be found in good numbers within Rockingham County, primarily in areas with rocky substrate.

Anthony Hipps of Lexington has waded the river in this general area and says that silt plagues the Dan. As is true of many Piedmont waterways, visibility is often 2 feet or less. Anthony says that, from his experience and from talking to Dan regulars, a really good day on the river "will produce five to 10 smallmouth bass, the occasional largemouth and channel catfish, and lots of redbreast sunfish."

Cattle which have free access to creeks entering the Dan contribute to destruction of the riparian zone. Waterers and fences will help prevent that. Farmland with no buffer contributes to the café au lait color of the river. Despite its problems, Kevin Hining (far right) says the Dan can be a good smallmouth and redbreast river.

The aesthetic quality of the stream, though, is a major draw to the few who ply the river, especially for those paddlers who live in the Greensboro-to-Winston-Salem corridor.

From Rockingham County to Kerr Lake

District 3 fisheries biologist Kirk Rundle says that as the Dan flows through Rockingham County, nears the Virginia line and eventually flows into Kerr Lake, the stream faces turbidity and other problems—and a very important potential solution.

"Although there are some very picturesque sections with quality habitat and fishing opportunities on the Dan, of interest is that the majority of the North Carolina portions of the Dan and Smith rivers are negatively impacted due to elevated turbidity levels," says Rundle. "The elevated levels are primarily caused by land disturbance from development, [which includes] impervious surface areas, construction sites, land clearing, loss of riparian zones, stream bank erosion and poor agriculture practices. The majority of North Carolina counties containing the Dan are expected to have a continuing trend of substantial population increases.

"Some good news is that several water quality improvement programs have been implemented. One example is the N.C. Agriculture Cost Share Program, which helps reduce agricultural runoff by helping farmers implement best management practices. This program has provided considerable funds toward implementing sediment and nutrient reduction practices, as well as animal waste management, and eliminating livestock from streams within this river basin."

District 5 fisheries biologist Corey Oakley agrees with Hining and Rundle about the Dan's sedimentation problems, saying that tributary streams such as the Mayo and Smith rivers in Rockingham County contribute high amounts of sediment into the main stem of the Dan. He says that many local folks have told him that the Dan always turns chocolate during a rain event, something that has been happening for a long time.

"Nevertheless," continues Oakley, "several areas of rocky bedrock substrate exist and often provide quality angling. The Wildlife Commission has two boating access areas along the river, one in Eden in northern Rockingham County and the other on the state line at Milton in northern Caswell County."

Virginia fisheries biologist Scott Smith offers this overview of the Virginia Dan: "There are some largemouth, smallmouth and spotted bass in the Dan. It's not exactly a great river for any of them. Once you get below Danville, it's an excellent river for suckers and catfish. Habitat for bass and sunfish is somewhat limited, though.

"The further downstream you go on the Dan," Smith says, "the worse the sediment load becomes. There are a lot of reasons for this, one of them being the geology of the

area. Once the river gets below about Eden, you see a heavy increase in sand-silt. This really reduces the habitat in the river for most fish species."

Smith adds that from the Brantley Steam Plant dam in Danville, not far above the U.S. 29 bypass crossing, float fishermen can use either a Virginia or North Carolina license downstream through Kerr Reservoir and Lake Gaston. That section below the dam is floatable in a canoe or motorboat, provided the motorboat isn't too big.

Oakley notes that striped bass and blue catfish leave Kerr Reservoir and migrate up the Dan River to spawn every spring. "I have sampled the fishery a few times up there in the spring," he says. "The striped bass can be quite large—15-pound class. I am sure there are larger ones; we just haven't really seen them. The blue catfish do reach quite large sizes in the reservoir, greater than 50 pounds, so I would think that there are some larger individuals in the river as well. Most of this action takes place in the Dan River stretch east of Danville, the Milton access."

Conservation Group at Work

Katherine K. Mull, executive director of the Dan River Basin Association (DRBA) in Eden, covers most of eight counties in Virginia and North Carolina but says the majority of the organization's work across the Dan's 3,300-square-mile watershed takes place in areas downstream of Hanging Rock

The Dan's Issues

Biologist Kevin Hining maintains that the Dan faces two major problems.

ACCESS: Anglers will have little trouble finding spots to put in and take out, primarily along bridges, but only a small handful of these access areas are truly "public." As a result, access will likely become more limited as development occurs and land is posted.

"Hopefully, local government and other entities will continue to establish permanent public access areas along the river," emphasizes Hining. "As we are experiencing on the South Fork of the New and other streams, purchasing property for access is only getting harder as land prices continue to rise and development increases, although the current economic issues may help slow this for the time being. Though the river is a great natural resource, and possibly a great economic resource as a result of its recreational uses, its potential can be realized only if access is available."

SEDIMENTATION: There are numerous sediment impacts within the Stokes County section. Although the riparian area along the Stokes County section is fairly good, many of the tributaries carry high sediment loads. Hining says that it's not uncommon immediately downstream of tributaries to see long stretches of once-rocky river bottom that are now covered in sediment. Many of the tributaries actually have mid-channel islands and small deltas just downstream of their mouths made up of the sediment that these small streams carry.

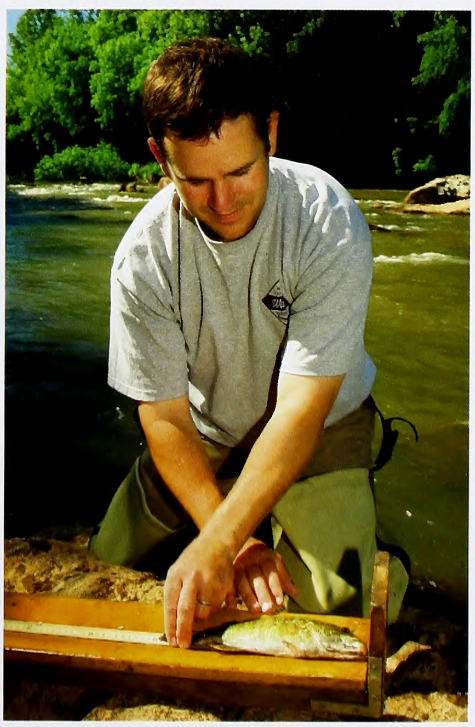
"I can only guess that much of the sediment is due to the lack of buffers along fields containing livestock and agriculture," says the biologist. "Regardless, once you get a few hundred meters downstream of these tributaries, the river is extremely nice, with lots of pools containing large boulders and ledges as well as rocky riffles and runs."

Information Sources

Kevin Hining says that the Dan River Basin Association has a list of public access sites (as well as lots of other information) at www.danriver.org.

Hining also suggests consulting the Wildlife Commission's website, www.ncwildlife.org, for information on access sites for the Dan, as well as other rivers and lakes.

For the Virginia section, biologist Scott Smith suggests the following: www.dgif.virginia.gov/fishing/waterbodies/display.asp?id=148.



The Dan flows through forested floodplain as it empties into Kerr Lake.

State Park or in the Smith River subshed. Water monitoring, bacteria studies, riparian buffer education, nature, heritage and tourism work are all part of the agency's charge.

Mull says the DRBA has two main areas of concern:

- Interbasin transfer and the need for a basin-wide conversation regarding water withdrawals and water allocation during periods of low flow, as well as source water protection.
- The threat of uranium mining, milling and long-term tailings storage in Pittsylvania County, Va., where reportedly the largest ore deposit in North America is located. "Such mining has never occurred in an area with our climate and hydrology—where precipitation exceeds evaporation," says Mull. "The globally rare Roanoke River ecosystem is downstream of the area proposed to be mined.

"We are increasingly being asked to address a host of issues such as timbering/clear-cutting, loss of riparian buffers and protection of cold-water fisheries—as well as ensuring healthy waterways to support ecosystems, drinking water supplies, recreation, and nature and heritage tourism," she says.

Local Farmers at Work

Last summer, I spent a day in the Dan River watershed visiting farms where the landowners have been working hard to improve their streamside habitat and, as a result, better the fish habitat downstream. Guiding me are Ken Bridle, stewardship director for the Piedmont Land Conservancy, and Rodney Wright, watershed coordinator for the Stokes Soil and Water Conservation District. Our first stop is the farm of Bruce Tilley, whose 540-acre property lies on the Stokes and Surry county line and contains six streams and four springs.

Tilley proudly shows me a riparian zone improvement project on Big Creek that is taking place on his and an adjacent neighbor's properties. To be sure, the project is both impressive and multifaceted. It includes the following.

- Stream matting: Picture a house's welcome mat of normal thickness but much

How Landowners and Citizens Can Help the Dan Watershed

Kirk Rundle says that the N.C. Division of Water Quality prepares basin-wide water quality plans for each of the state's watersheds. "The goals of the plans are to identify water quality problems and restore full use to impaired waters, identify and protect high-value resource waters, and protect unimpaired waters while allowing for reasonable economic growth." For more information, see http://portal.ncdenr.org/web/wq/ps/bpu.

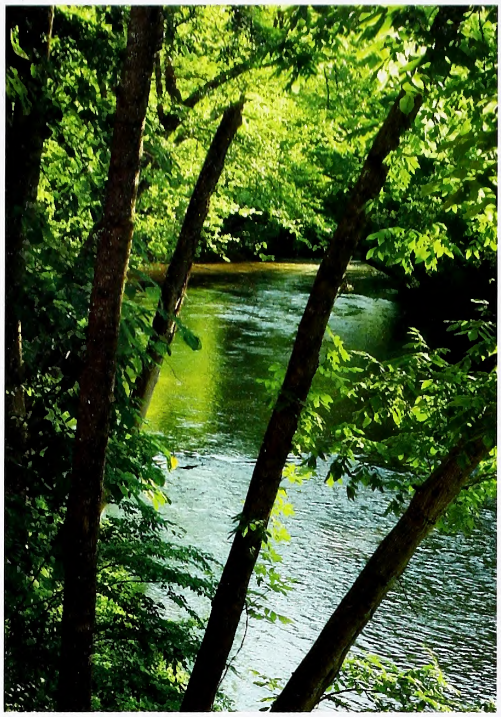
Rundle adds that the N.C. Division of Soil and Water Conservation has districts that are responsible for administering the Agricultural Cost Share Program for nonpoint source pollution control at the county level. Districts are responsible for identifying areas needing soil and water conservation treatment, administering cost share resources, signing cost share contracts with landowners, providing technical assistance regarding best management practices, and promoting the use of best management practices to protect water quality. Contact information: www.enr.state.nc.us/DSWC.

Information regarding federal programs and assistance can be found at the U.S. Department of Agriculture's Natural Resources Conservation Service, www.nrcs.usda.gov.

BRUCE INGRAM

BRUCE INGRAM

Big Creek on Bruce Tilley's farm benefited from stream restoration techniques such as cross veins (rocks spanning the stream behind Tilley) and root wads (top right). Raccoons and other wildlife are common.



Dramatic cliffs are part of the thrill of exploring the Dan by canoe. The river also offers a splendid view of Moores Knob. Guides such as Dale Swanson of the Dan River Company can provide expert tours —Swanson is also a staffer at the non-profit Dan River Basin Association.

longer and wider and with many openings, and you have an idea of what a stream mat is. Perennial rye grass was planted underneath the mats and now serves to stabilize the bank.

- Root wads: An approximately 20-foot section of a hardwood tree is jammed into the stream bank, leaving only the root system exposed. A row of wads helps to stabilize the bank and prevent erosion, cools the water and provides cover for both stream and terrestrial creatures.
- Cross veins: A series of large rocks is placed to create an inverted V in the creek. This forces the current away from the banks, which results in deeper, more "fishy" pools and less streamside erosion.
- Silky dogwood and willow stakes: This involves cut dogwood and willow stems (18 inches long and "finger wide") that have been placed along the shoreline during winter, when they are dormant. The stems send down roots during the cold-weather period and turn into young trees when spring arrives, thus aiding the stream stabilization process.
- Plunge pool creation: A hardwood log is placed horizontally across a stream and is anchored with a small boulder. Water runs across and down the structure, creating a plunge pool—more great fish habitat.

As we are about to leave, Tilley shows us where North State Environmental Inc. of Winston-Salem will build a fence on his neighbor's land. The fence will prevent cattle from entering the creek and destroying the budding riparian zone. And on our way out, Tilley points out fields that used to be planted in tobacco but are now growing such wildlife-friendly plants as oats, clover and lespedeza. Later, Tilley will hay these fields for a cash crop.

Next, Bridle drives us to a farm where he planted willow and dogwood stakes along Snow Creek some half-dozen or so years ago. At that time, the creek was straight because of channelization and lacked a riparian zone. But Bridle explains that the stream had its "meanders put back in," the stakes were planted and the banks were stabilized with boulders. Now, a vibrant riparian zone exists, the willows and dogwoods grow in profusion along the banks, and I hear the singing of two thicket-loving bird species, indigo buntings and yellow-breasted chats.

Last, we visit the 250-acre Stokes County spread of Willis Overby, a retired school principal. Overby's farm also lies on Snow Creek, and the farmer has constructed some 2½ miles of fences along the stream in order to keep his cattle out and to establish a riparian zone measuring at least 50 feet throughout. Just outside the fence in several places, Overby has planted walnut trees, as they are excellent mast producers. The only time the cattle cross the stream is when Overby moves them from one paddock to another. Overby also shows us his "waterer," which is a structure cattle can use to consume water and thus not degrade the stream's banks.

The Dan's Future

What does the future hold for the Dan River? Biologist Rundle knows what he would like to happen.

"I think one of the obstacles with improving the Dan is the crossing of state lines, which presents regulatory and psychological barriers," he says. "However, if folks at local levels get involved and work in cooperation across boundaries, there will be a range of knowledge available that could encourage substantial funding for worthwhile activities. And many more people are becoming involved and realizing how important water quality is and that the river belongs to all of us."

By their actions, Bruce Tilley and Willis Overby certainly have proved that they are involved with making the Dan Watershed better. "What I've done on my farm gives me a good feeling," Tilley says. "I know that when I'm dead, I will have left the land better than I found it."

Overby expresses a similar sentiment about his efforts. "I see more wildlife on my place than ever before," he says. "I believe that what I've done on my land has helped that come about." ◆

Bruce Ingram is the author of several books on rivers and fishing, including "Fly and Spin Fishing for River Smallmouths" ($19.25). To purchase one, contact Ingram at be_ingram@juno.com.

Trip Planner

LODGING

Hunter House B&B in Madison: www.hunterhousebedandbreakfast.com, (336) 445-4730
Hanging Rock State Park: www.stateparks.com/hangingrock, (336) 593-8480
Rockingham County Partnership for Economic and Tourism Development: www.ncnorthstar.com/tourism, 1-800-316-ROCK

CANOE RENTAL

Dan River Campground: www.danriveradventures.com, (336) 427-8530
Dan River Company: www.danrivercompany.com, (336) 593-2628

CONSERVATION

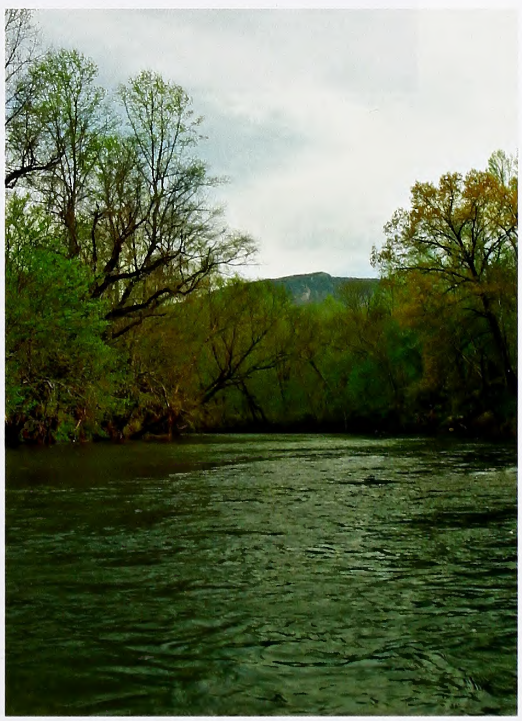
Dan River Basin Association: www.danriver.org, (336) 627-6270
Piedmont Land Conservancy: www.piedmontland.org, (336) 691-0088
Pilot View Inc. (Resource Conservation and Development) is a nonprofit organization formed to help community groups carry out projects that protect natural resources: www.pilotview.rcdnet.org/pvhome, (336) 750-0522

Side Trip to Hanging Rock State Park

Hanging Rock superintendent Dave Cook says that the park makes a convenient base for those wanting to explore the Dan. A concrete boat ramp exists at the park, along with a gravel parking lot.

"High stone cliffs on the north side characterize the Dan River as it flows through the state park," says Cook. "To the south are several mountains, including Moore's Wall, Hanging Rock Ridge, Cook's Wall and Sauratown Mountain, also characterized by high cliffs and large rock outcrops. Five scenic waterfalls are here, too, and are accessible by a good trail."

Also available are picnicking, vacation cabins, rock climbing, environmental education, family and group camping, lake fishing, swimming and boat rental, and hiking trails leading to scenic overlooks.



Q&A with Gov. Bev Perdue

KEN TAYLOR/NCWRC

North Carolina's chief executive talks about protecting natural resources and sustaining access to these public lands and waters.

ACCESS

Q: Increasing access to outdoor resources such as public land and waterways is one of the Wildlife Commission's strategic objectives. This type of access is especially important because it would provide outdoor opportunities for diverse groups and expand the constituency base of the Wildlife Commission — two other agency objectives. However, this type of access to outdoor resources is declining in part because of the state's rapid population growth. The General Assembly's Waterfront Access Committee has been successful in its efforts to provide access to coastal waterways. How might their efforts be used as a model for future plans to expand access to land and water across the state?

A: Preserving and expanding access to public land and water in our state is critical. As more North Carolinians are able to enjoy the remarkable natural resources our state has to offer, a deeper respect and appreciation for environmental stewardship is developed. We should all be focused on protecting this access for future generations of hunters, fishermen and outdoor enthusiasts. As we continue to develop new and creative ways to work together on this issue, the Waterfront Access Committee's accomplishments serve as a great example for future collaborative efforts in this area.

FUNDING

Q: With North Carolina's human population continuing to grow, conservation of wild land is more important than ever. The Clean Water Management Trust Fund and Natural Heritage Trust Fund are important tools for conserving natural areas and the ecosystem functions they support.

What is your vision for the continued use of these funds? How can funding and the historic level of accomplishment of these funds be sustained into the future?

A: The Clean Water Management Trust Fund, the Natural Heritage Trust Fund and the Parks and Recreation Trust Fund are among the most important tools we have to continue protecting and preserving our state's natural resources. As Governor, I have worked closely with the trust fund boards and staffs and with the land conservation community to make sure we do not lose important ground during this budget crisis. In the short term, we may face limits on our resources, but we cannot let this limit our vision of what we want to accomplish in this important area.

Q: How does government best balance the competing needs for infrastructure (such as schools, roads, hospitals, etc.) and natural resource conservation with smart growth and smart development?

A: With the rapid population growth we face, protecting and conserving our natural resources is more important than ever; they make North Carolina such a special place to live. Part of this balance is finding new opportunities and new ways to think about conservation and how important it is to our economy as well as our environment. We know that conservation and outdoor recreation bring good, green jobs to North Carolina, so there is an economic incentive to the conservation work we do as well.

NATURAL RESOURCES

Q: The Wildlife Resources Commission is responsible for long-term stewardship of public game lands, including maintenance of wildlife conservation values for public benefit. What is your view of the importance of sustaining these lands for the public trust?

A: As Governor, I want all North Carolinians to have opportunities to enjoy and benefit from our public lands, including our game lands. I rely on the stewardship and management of the commission to ensure that these lands continue to be accessible, open and productive for our people.

Q: A recent study found that mountain trout fishing provides a $174 million annual economic impact to the state. Along with the monetary value of wildlife, there is also a huge intangible benefit to having wild animals present in North Carolinians' everyday lives. What actions should state government take to sustain the diversity and abundance of the wildlife that draws tourists and improves the quality of life for residents?

A: Assessments such as the Wildlife Action Plan and planning tools through the One North Carolina Naturally initiative are so important to protecting the diversity and abundance of our wildlife. Using these and other resources, we can make decisions and set priorities based on data and facts to ensure that we are making the best use of our resources and acting as good stewards.

EDUCATION

Q: Considering the tangible and intangible benefits to the state of having abundant, diverse wildlife, what is the importance of educating citizens and visitors about wildlife and its habitats?

A: We must have public support to continue protecting North Carolina's land, water and wildlife. One of the ways we can maintain that support is through education and outreach to our citizens and visitors. As people better understand the diverse and vibrant natural resources we have, they develop a greater appreciation for protecting and preserving our state for future generations.

OFFICE OF GOV. BEV PERDUE

Gov. Perdue signs legislation authorizing the purchase of Grandfather Mountain as Dee Freeman (left), secretary of the N.C. Division of Environment and Natural Resources, and state Rep. Phillip Frye look on. The governor supports the protection of wild places such as Hammocks Beach State Park (opposite).

From the mountains to the coast, wild fruit feeds and nourishes North Carolina's wildlife ... and provides humans with tasty treats, too.

Nature's Fabulous Fruit Feast

written by Terry Krautwurst / illustrated by Consie Powell
nature activity by Anne M. Runyon

Supermarkets are great places to look for delicious fruit. But North Carolina's fields, forests, and hiking trails are even better places. From spring through fall and even into winter, trees, shrubs, vines and other flowering plants offer up a vast variety of wild fruits. All provide vital nutrition for birds and other wildlife. Many make great eating for humans, too.

Plus, wild fruit serves another sweet purpose: it helps sow the seeds of future generations of food-bearing plants.

SERVICEBERRY
Also called shadbush because it flowers in spring when shad migrate. Hungry bears emerging from their dens in spring look for the berries, which ripen in April and May. The fruit makes delicious pies and jams.

WILD STRAWBERRY
Small, but oh-so-sweet! Look in sunny meadows, May through June. Ruffed grouse and pheasants eat the leaves as well as fruit.

WILD CRABAPPLE
Tiny, fragrant crabapples ripen in September but never really sweeten. Colonists used them for cider. Deer love them in winter, after they've fallen and rotted.

Wildlife eat many more kinds of fleshy fruits than humans do. Some, such as mountain ash berries, simply don't taste good to us, or are too seedy. But other kinds of fruit are dangerous to humans. Among favored wildlife fruits are the toxic berries of mistletoe, pokeweed and poison ivy. Never assume that a wild fruit is safe for you to eat because you see an animal eating it.

WHAT IS A FRUIT?

When you pop a berry into your mouth or bite into an apple, you're eating what was once part of a flower. Scientifically speaking, a fruit is the mature ovary of a flowering plant. It's the part or parts that surrounds and contains seeds.

Most of the plant species on earth are flowering plants. So, many things that you might not think of as fruit actually are. Nuts are fruit. Grains such as wheat are tiny, husk-covered fruit. Milkweed pods are fruit. The little winged-seed "helicopters" that spiral down from maple trees are fruit, too.

Biologists classify fruit as either dry, such as those in the examples above, or fleshy. Fleshy fruits enclose their seeds within soft tissue covered by a skin or rind. They include those we usually think of as edible fruit, such as blackberries, apples, grapes, peaches and plums. And there are many other kinds of fleshy fruits, such as the berries on holly and dogwood trees, that humans don't eat but other animals do.

BLACK CHERRY
In July and August, robins, thrushes and other songbirds pluck the plump fruit hanging in clusters, while bears, raccoons and other mammals eat the cherries that drop to the ground.

WILD GRAPE
North Carolina's species include the aromatic muscadine and the widely distributed summer grape. Ripening in late summer through fall, wild grapes are consumed by many animals, including turkey, quail, opossums and foxes.

AGE-OLD FRUIT LOOP

Whether dry or fleshy, a fruit's job is to protect the seeds inside and to help disperse those seeds so they can take root and grow into new plants. Different plant species have evolved different fruit forms to distribute their seeds. Some produce pods, capsules, or other dry fruits that split open and sow their seeds on the ground or release them to the wind. Some, such as burdock, grow prickly capsules that hitch rides on animals' fur.

Fleshy fruits have developed a different strategy: they "want" to be eaten! When an animal eats ripe fruit and then walks or flies away, the seeds inside the fruit go along for the ride, unharmed in the creature's digestive system. When the animal defecates, the seeds come out, along with other waste that fertilizes and helps the seeds sprout and grow.

BLUEBERRY
Statewide, at least a dozen species of blueberries treat Tar Heels and wildlife to their tasty summer fruit. They're important food for grouse, songbirds, black bears, chipmunks and many other animals.

WILD PLUM
In late summer plump wild plums lie scattered beneath their trees and are a favored food of foxes. Tough-skinned and acidic, the fruit makes delicious preserves.

RED MULBERRY
Unlike the white mulberry, an Asian import, red mulberry is a North Carolina native. Its sweet, juicy fruit ripens to dark purple. Humans, squirrels and songbirds love them.

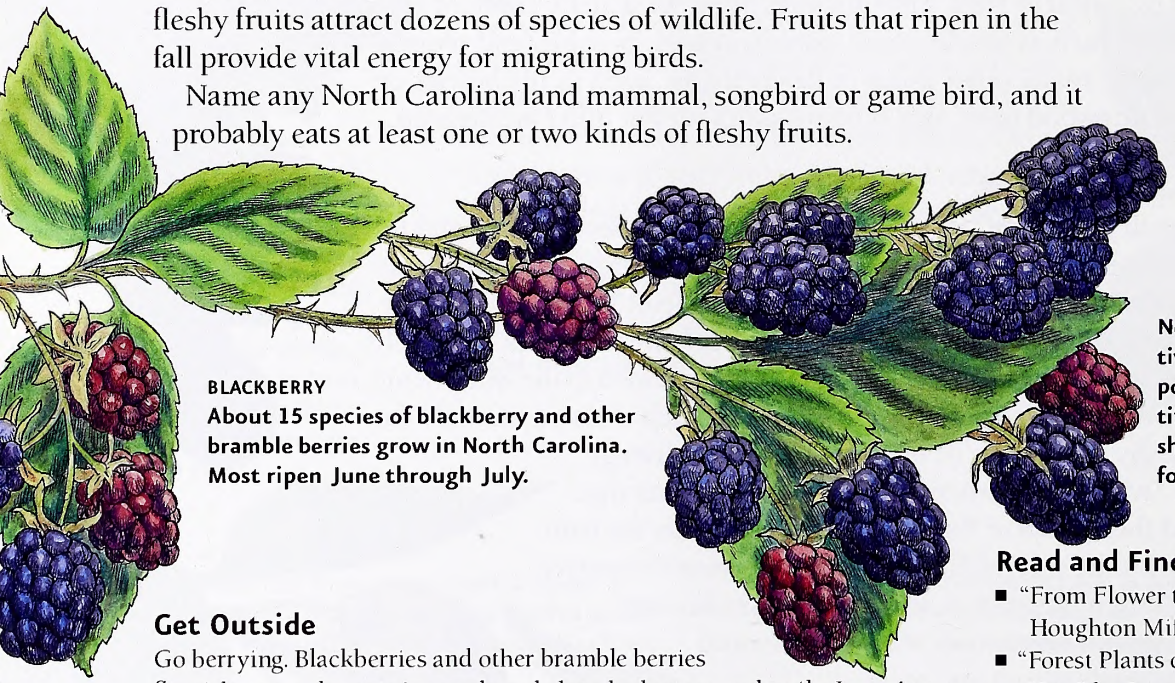
NATURAL FRUIT STANDS

Just as flowers evolved colorful petals and sweet scents that lure pollinating insects, fleshy-fruit plants "advertise" with fruit to attract animals that will eat and spread their seeds. While the seeds inside are developing, immature fruit is hard, green and often bitter. This keeps animals from eating it too early. When the seeds mature, the fruit softens, becomes juicy and sweet, and turns red, blue or some other easy-to-see color that says, "Come gobble me up!"

Animals feast on the delicious fruit, which is rich in vitamins and carbohydrates. The juice is an important water source, too. Most kinds of fleshy fruits attract dozens of species of wildlife. Fruits that ripen in the fall provide vital energy for migrating birds.

Name any North Carolina land mammal, songbird or game bird, and it probably eats at least one or two kinds of fleshy fruits.

PERSIMMON
Unripe persimmons are bitter. Wait till they become squishy-ripe, usually in late fall. But don't wait too long, or raccoons and opossums will beat you to them.



BLACKBERRY
About 15 species of blackberry and other bramble berries grow in North Carolina. Most ripen June through July.

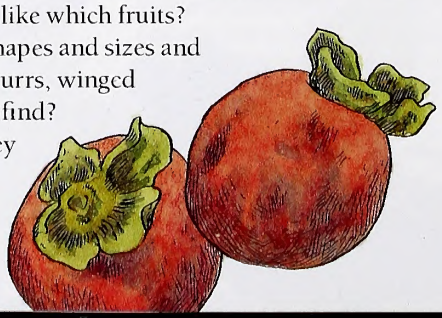
Never eat a wild food you can't positively identify as safe. Fortunately, most popular edible fruits are easy to identify — and delicious! All the fleshy fruits shown on these pages are edible, and found in most parts of the state.

Get Outside

Go berrying. Blackberries and other bramble berries flourish across the state in woods and along hedgerows and trails. In spring, keep an eye out for the bushes' telltale white flowers, and make a mental note of their locations. Then in summer when the berries are plump and juicy, grab a bucket, wear a long-sleeved shirt and heavy pants to protect you from the briars, and go picking. Choose only the ripest berries, so there'll still be plenty left on the bush to ripen for other animals.

Be a fruit detective. What kinds of birds and mammals eat which kinds of wild fruits? Find an area with fruit-bearing bushes, trees or shrubs, and use binoculars to watch the birds and other animals that come to dine. Can you identify them? Which species like which fruits?

Collect dry fruits. How many shapes and sizes and kinds of dry fruits — seed pods, burrs, winged seeds, nuts and others — can you find? Try to figure out which plants they came from.



Read and Find Out

- "From Flower to Fruit" by Anne Ophelia Dowden, Houghton Mifflin, 1994.
- "Forest Plants of the Southeast and their Wildlife Uses" by James H. Miller and Karl V. Miller, University of Georgia Press, 2005.
- "A Field Guide to Edible Wild Plants: Eastern and Central North America " by Lee Allen Peterson, Houghton Mifflin, 1999.

In *Wildlife in North Carolina*:

- "Berry Berry Beautiful" by Jim Casada, May 2002.
- "The Forgotten Persimmon" by Mark Joyner, October 2007.

Find out more about Project WILD Workshops and literature at the Wildlife Commission's website at www.ncwildlife.org.

Make a Wild Recipe Box

1) Copy box design on 65 lb. cover stock paper. 2) Cut out the design. 3) Fold up along all the ···· lines. Three flaps will overlap at each end of the box. 4) Glue flaps shut, making sure the words are on top. 5) Gather more recipes for wild fruits, nuts, roots, fish and game. Write them on 3"x 5" cards, and store them in your Wild Recipe Box.

This activity may be copied for educational purposes.

Public Hearings Scheduled for September

The N.C. Wildlife Resources Commission has set dates for its annual public hearings, the first since the commission voted in February to move the hearings from January to September as a part of overall adjustments to its rulemaking cycle. All hearings begin at 7 p.m.

"Adoption of rules on an annual basis is critical to meeting our conservation objectives," said Gordon Myers, executive director of the Wildlife Resources Commission. "Prior to making these changes, the commission's rulemaking cycle was severely impacted by delayed implementation of rules. These impacts were felt by our sportsmen and created a great deal of confusion. By adjusting our annual rulemaking cycle, we are able to better ensure timely adoption of rules while providing better service to North Carolina's sportsmen."

Each year, the commission adjusts hunting, fishing and trapping seasons in response to wildlife population changes, wildlife conservation objectives or public needs and desires. Public comment on proposed rule changes is a critical component in the decision making process. The commission will continue to provide a variety of public input options including online, written and face-to-face opportunities.

This is not the first time the commission has adjusted its rulemaking cycle. Prior to the 1980s, inland fishing and hunting regulation proposals were developed on separate schedules; public hearings were conducted in September for inland fishing regulation proposals and April for hunting regulation proposals. In 1983, the Commission integrated the cycles and began conducting a single set of public hearings in the month of March. Several years later, as a result of changes in the Administrative Procedure Act, the commission moved the hearings again to the month of January. The purpose of the change was to ensure that regulations could be implemented prior to hunting and trapping seasons.

MELISSA MCGAW / NCWRC

For more information on the rulemaking process, read "From Proposal to Regulation" at www.ncwildlife.org/Regs/documents/ PubHearBrochure.pdf.

DATE	DISTRICT	CITY	LOCATION
Sept. 7	4	Dublin	Bladen Community College
Sept. 8	5	Pittsboro	Central Carolina Comm. College
Sept. 9	6	Norwood	South Stanly High School
Sept. 14	8	Morganton	Municipal Auditorium
Sept. 15	9	Clyde	Haywood Community College
Sept. 16	7	Wilkesboro	Wilkes Community College
Sept. 21	1	Edenton	Swain Auditorium
Sept. 22	2	New Bern	Courthouse
Sept. 23	3	Rocky Mount	Nash Community College

e NEWSLETTER
Get N.C. Wildlife Update—news including season dates, bag limits, legislative updates and more—delivered to your Inbox from the N.C. Wildlife Resources Commission. Sign up at www.ncwildlife.org/enews.

Delayed Hunting and Trapping Rule Changes Take Effect Aug. 1

The proposed hunting and trapping rule changes approved by the N.C. Wildlife Resources Commission in March 2009 but delayed for legislative review will go into effect on Aug. 1, along with hunting, trapping and fishing rules proposed for the 2010–11 seasons and approved by the commission in March 2010.

Fifteen hunting and trapping proposals were referred to the General Assembly by the N.C. Rules Review Commission in April 2009 in accordance with the Administrative Procedure Act. As a result, the rule changes could not take effect until they were reviewed by the legislature, which convened in short session on May 12 of this year.

Four bills were introduced disapproving the commission's rules. Because none of the bills were enacted into law, the following changes will take effect Aug. 1:

- Remove the daily bag limit for deer.
- Allow hunters to use archery equipment to harvest deer during the muzzleloading season on game lands.
- Hunting dates in the Northwestern deer season will be changed so that the regular gun season is extended through Jan. 1 on private lands and game lands. Hunting dates in the Eastern, Central and Western deer season structures will remain unchanged.
- Shorten the bow-only deer season by one week and open the muzzleloader season one week earlier to create a two-week muzzleloader deer season.
- Open all private lands in the Eastern, Central and Northwestern deer seasons to the maximum either-sex deer season.
- Allow falconry on Sundays, except for migratory game birds.
- Allow bow hunting on Sundays on private lands only, except for migratory game birds.
- Allow the use of crossbows anytime bow and arrows are legal weapons.
- Disallow the selling of live foxes and coyotes taken under a depredation permit to controlled hunting preserves.

Visit www.ncwildlife.org for a full list of regulations that take effect this month. The *2010–2011 North Carolina Inland Fishing, Hunting and Trapping Regulations Digest* will be available on the website on Aug. 1. Hard copies will be available mid-August.

Ashe County's Trout Lake Open Again

Trout Lake in Ashe County is once again open for fishing. Repairs to the lake's dam and water control structure were recently completed, and staff with the N.C. Wildlife Resources Commission stocked the lake with brook, rainbow and brown trout this week.

The popular angling site, which is owned by the Ashe County Wildlife Club and managed by the Wildlife Commission under Delayed Harvest trout regulations, had been closed since February 2009.

"We are thrilled to finally have these repairs completed so the public can once again fish at Trout Lake," said Kin Hodges, a fisheries biologist with the commission. "Trout Lake is currently the only lake managed under Delayed Harvest regulations, and it is utilized by anglers from all over northwest North Carolina."

Under Delayed Harvest regulations, anglers must fish with single-hook, artificial lures and release all trout caught from Oct. 1 until the first Saturday in June. On June 5, Trout Lake, as well as other Delayed Harvest waters, opened under Hatchery Supported regulations at 6 a.m. for anglers age 15 and under and at noon for all other anglers. While fishing on Hatchery Supported trout waters, anglers can harvest a maximum of seven trout per day, with no minimum size limits or bait restrictions.

No Social Bunch

Most hunters and anglers are not flocking to Twitter, nor are they putting in much face time at Facebook. According to recent polls by Southwick Associates, 64 percent of hunters and anglers report they are not using social networking sites to obtain outdoor information.

Those hunters who are using social media prefer Facebook, with 24 percent reporting using that site, while 10.7 percent said they visit YouTube. MySpace is popular with 9.6 percent of those who participated in the May HunterSurvey.com poll. The poll also revealed 3.2 percent of hunters use CamoSpace, 2.5 percent visit LinkedIn and 2.4 percent favor Twitter.

Anglers also prefer Facebook. More than 22 percent of those who participated in the AnglerSurvey.com poll said they used Facebook. YouTube came in second at 11 percent and MySpace was popular with 8 percent of those polled. LinkedIn was favored by 3.6 percent of respondents while 2.5 used Twitter.

Southwick Associates assists natural resource agencies and the outdoor industry in quantifying the business side of fish and wildlife.

ILLUSTRATIONS BY DUANE RAVER

CALENDAR OF EVENTS

Saturday–Sunday, August 7–8

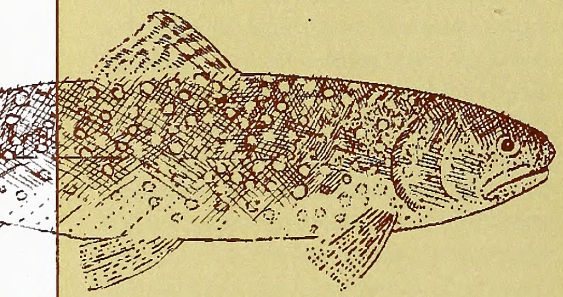
See the latest in guns, knives and other outdoor gear at the Dixie Gun & Knife Classic at the Jim Graham Building on the N.C. State Fairgrounds in Raleigh. Visit www.dixiegunandknifeshow.com.

Thursday, August 12

Get into fly-fishing with Pisgah Wildlife Education Center's Casting for Beginners class. Participants will learn the overhead cast, roll cast and false casting. Class is held at Lake Imaging in DuPont State Forest. Ages 12 and up. Visit www.ncwildlife.org.

Friday–Sunday, August 20–22

Check out the latest in boats at the Carolina Fall Boat Show & Sale at the N.C. State Fairgrounds in Raleigh. Visit www.ncboatshows.com.



IN SEASON

This month, these seasons are open in North Carolina:

Hatchery Supported Trout Waters: Through Feb. 28, 2011.

Crow: Wednesday, Friday and Saturday of each week through Feb. 28, 2011, plus Labor Day, Thanksgiving, Christmas, New Year's Day and Martin Luther King Jr. Day.

There is no closed season or bag limit for groundhog, coyote, striped skunk and nutria. There is an open season for taking beaver with firearms during any other open season for the taking of wild animals.

Check the *2010–2011 North Carolina Inland Fishing, Hunting and Trapping Regulations Digest* for bag limits and applicable maps or visit www.ncwildlife.org.

Safari Clubs Honors Mays with Pathfinder Award

Ed Mays has had excuses to give up hunting; he simply has refused to use them.

Mays, one of two winners of the Safari Club International's 2009 Pathfinder Award, was struck by lightning on guard duty in 1980, causing extensive nerve damage, and was honorably discharged from the U.S. Army in 1981.

The Pathfinder Award is presented to an individual who is faced with overcoming a physical challenge or disability that interferes with a routine way through life. He or she must discover previously unexplored regions of self-esteem, self-worth, courage, persistence and determination.

In 1993 Mays was diagnosed with relapsing remitting multiple sclerosis. He semi-retired and stayed home to care for his three sons. He was confined to a wheelchair in 1995 due to paralysis of his right leg and problems with his left arm. In 1998, Mays was diagnosed with secondary progressive multiple sclerosis.

The lightning strike, Mays said, was the start of his physical problems. "Little did I know that was the beginning of being diagnosed with MS. There's not a lot of documentation on it, but if you have the virus for MS, an electrical trauma of that sort will cause exacerbation of the disease 100 percent of the time."

Mays, who grew up hunting and fishing with his father in southwestern Pennsylvania, was determined that his physical problems would not keep him from the outdoors. "I tried to maintain my hunting and fishing," he said. "It was difficult with the mobility issues. When I was restricted to a wheelchair, some members of the Paralyzed Veterans of America came to visit. "They showed me that being in a wheelchair was never going to stop me."

Mays and his wife, Mary, retired in 2001. They moved their family from Atlanta to Nags Head in 2003. "I thought when I retired it would be a great thing," Mays said, "but it was the most boring, depressing thing I've ever encountered."

In Nags Head, Mays began working to provide hunting and fishing opportunities for the handicapped. North Carolina had only a handful of hunts for the handicapped at the time. Mays attempted to take part in one in 2004, but found after he arrived at the location that in order to hunt in that county with a rifle, a hunter had to be 8 feet above the ground.

MELISSA MCGAW / NCWRC

Mays (center) with chairman Steve Windham (left) and commissioner Nat T. Harris of the N.C. Wildlife Resources Commission.

"I really took that to heart," Mays said. "In Wyoming that year on an antelope hunt, I talked to Lt. Col. Lew Deal [director of outdoor programs for the Armed Forces Foundation] about the situation in North Carolina. It ended up with him donating the first Huntmaster to the state."

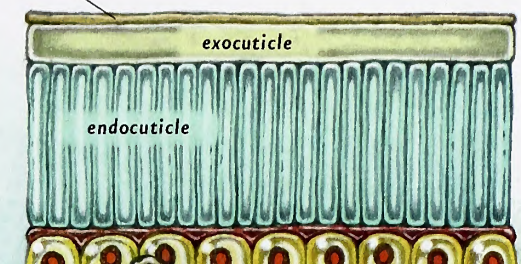
Mays founded the North Carolina Handicapped Sportsmen (NCHS) in May of 2005. In July 2006, NCHS signed a partnership agreement with the N.C. Wildlife Resources Commission. In 2008, Mays helped the Wildlife Commission's Disabled Sportsmen's Committee develop a proactive strategic plan to address disabled sportsmen's needs.

He helped raise more than $140,000 to purchase 10 new Huntmaster lifts that were donated to the commission. NCHS purchased new shooting rigs and adaptive equipment for disabled hunters, and provided free hunting opportunities for more than 80 veterans, men, women and children. Mays continues to raise funds, coordinate events, and advocate for disabled sportsmen. To find out more about upcoming NCHS hunting opportunities and to see photos and videos of past events, visit www.nchandicappedsportsmen.com.

How Do Insects Molt Their Exoskeletons?

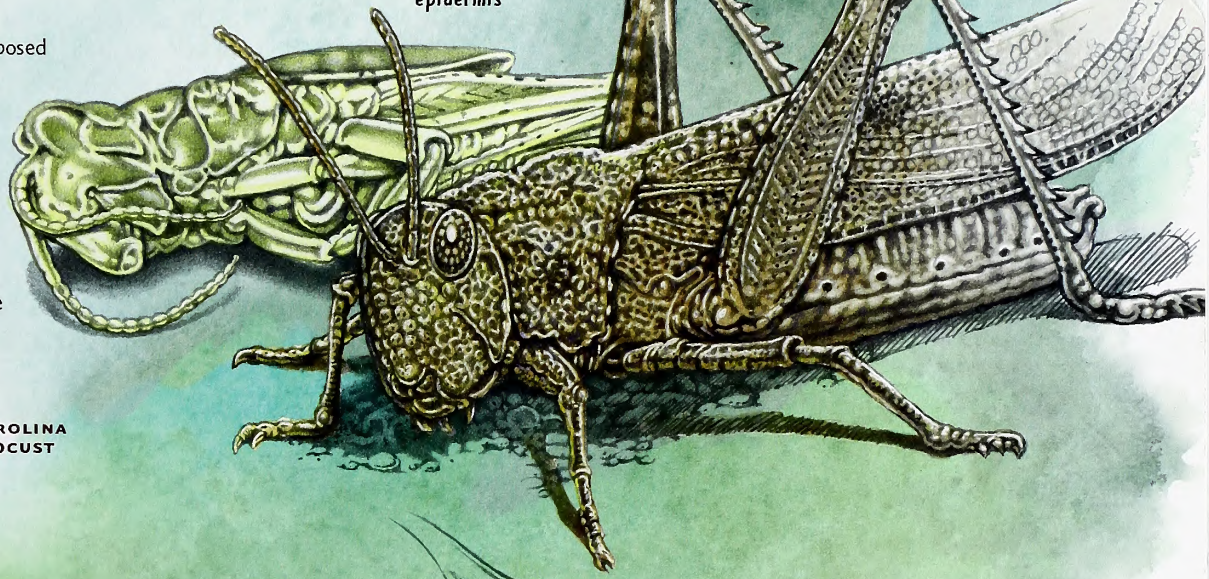
written by Clyde Sorenson
illustrated by Jim Brown

THE CHITINOUS EXOSKELETON OF INSECTS and other arthropods is one of the many factors contributing to their great success. It functions as both armor and scaffold, protecting and supporting the insect's body. But exoskeletons don't stretch, and in order to grow, insects and their relatives must molt the old.



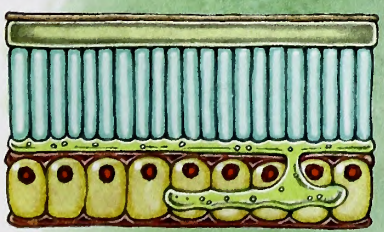
EXOSKELETON CROSS SECTION

An insect's exoskeleton is composed of several layers, but only one, the epidermis, is alive. The epidermis, only a single layer of cells thick in most places, manufactures the rest of the structure. The endocuticle is flexible and allows movement; the exocuticle is stiff, thick, and tough. The epicuticle plays the critical role of waterproofing the exoskeleton.

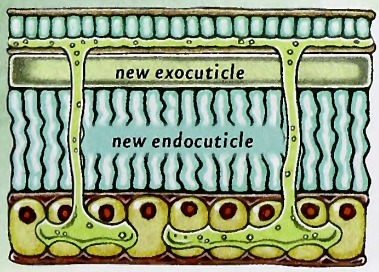


CAROLINA LOCUST

When the epidermis receives the signal to make a new cuticle, it first secretes an inactive version of a chemical called molting fluid under the recently separated old cuticle and then lays down part of the new epicuticle. The molting fluid then dissolves the old endocuticle for recycling. As the old dissolves, the new exocuticle and then endocuticle are laid down under the new epicuticle. Since the new must be larger than the old, it is wrinkled and wadded up under the old.



secretion of molting fluid



new exoskeleton formation

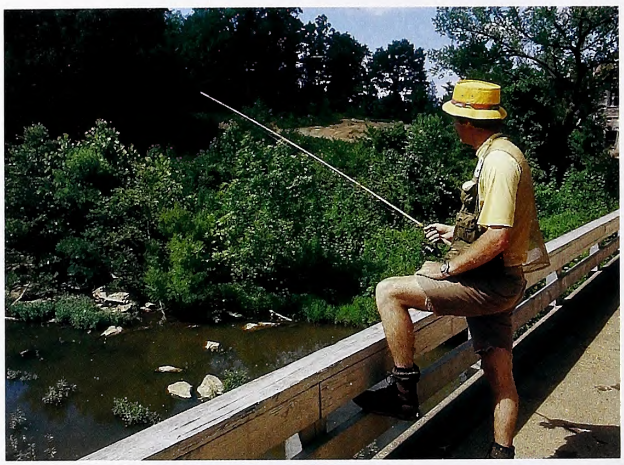
EMERGING LOCUST

When the new exoskeleton is ready, the insect retreats to a safe place and gulps air into its air sacs and digestive tract. The old exoskeleton splits, usually along the back, and the critter wriggles out. When it first emerges, it is usually pale and soft, and it may use the blood circulating in its body to help expand wings and other structures. It takes from a few minutes to many hours for a chemical reaction to completely harden and darken the exocuticle, a process called tanning, before the insect can go on its way.

Creeks and Antiques

written by Jim Dean

Some of my fondest fishing memories can be traced to periods of my life when I owned hardly any tackle. Surely, most of us can recall those years of youthful poverty when our greatest angling asset was enthusiasm. We didn't let a deficit of gear stand in our way, of course. We were determined to fish even if all we could afford was the cheapest and most basic tackle. Looking back, the irony is that we always had a lot of fun, maybe as much as we've ever had since.



JIM DEAN

I was reminded of that recently when I was prowling around in the basement looking for a misplaced toolbox. In a dark corner, I spotted several long-forgotten rods and reels and a moldy vest that I had not seen in many years. I pulled them out —scattering several dozen indignant mole crickets. Gosh, I thought, I didn't know I still had this stuff. As I wiped off decades of dust and cobwebs, I felt a little like an archaeologist who had uncovered an ancient tomb.

"Surely, most of us can recall those years of youthful poverty when our greatest angling asset was enthusiasm."

One of the rods was a derelict fly rod given to me by my grandfather, while another was a spin-cast outfit that was missing its original tip (I had fashioned a makeshift tip out of a coat hanger wrapped with masking tape. It worked, sort of, but needed re-straightening whenever a fish was caught).

The prize of the lot, however, was a noodly ultralight spinning rod that I had built on a $4 Herter's glass blank shortly after I returned to North Carolina from military service in 1964 to take my first job as a $70 a week cub reporter for the *Burlington Times-News*. I recalled that the little off-brand spinning reel had cost $6 new—you remember such things when they represent most of a week's groceries. In one pocket of the vest was a plastic box containing a tangle of rusty lures.

Back when that rod was new, I didn't have a boat so I did most of my fishing from the banks of ponds or nearby lakes. I soon discovered, however, that there were many small creeks and rivers in the Piedmont that could be easily waded (to keep from slipping, I glued carpet to the soles of an old pair of sneakers).

I picked my spots by driving country roads until I saw a likely stretch of water under a bridge. I caught lots of robin and other panfish, and more largemouth bass than I anticipated, along with some rambunctious chain pickerel. In some creeks, I also caught Roanoke bass (a cousin of the rock bass that locals call redeyes). It was not unusual on some days to get a strike on nearly every cast.

Once, I landed a pickerel nearly 2 feet long that I had to chase 100 yards downstream, and I had some epic battles with several largemouths that seemed way too big to thrive in such small water.

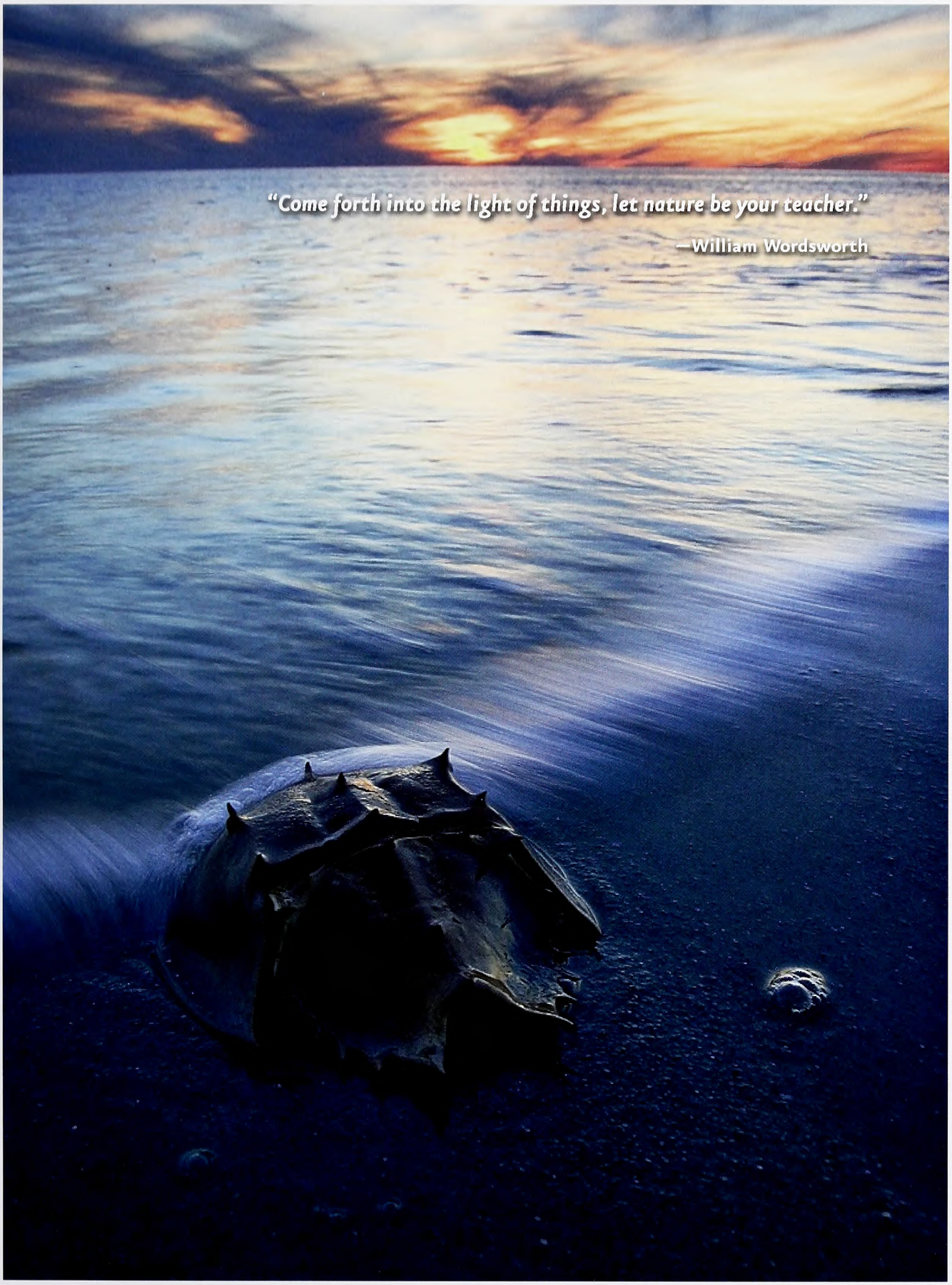
By necessity, and accident, I had discovered one of North Carolina's best, and least known, sport fisheries. Not only were those creeks and small rivers beautiful places to fish, I almost never encountered another angler even when wading forested corridors through the edges of cities or beside highways. Many of those good spots were only minutes from home.

It may come as a surprise, but this exciting near-wilderness fishery still exists throughout the Piedmont and well into the foothills, and you can also expect to have it mostly to yourself. Furthermore, thanks to the Clean Water Act, most of these creeks are less polluted now than they were then.

You certainly don't need a lot of gear. Good quality small spinning reels with 4- or 6-pound mono are not terribly expensive, and modern graphite ultralight spinning rods are far superior to that wimpy Herter's stick. Mepps, Panther Martins and similar lures still work great, along with the venerable Beetle Spin, small soft-plastic curly-tailed jigs, and a few small Rebel or Rapala minnows. You can carry all you need in a small box in a shirt pocket. A pair of hemostats will help remove hooks from fish.

You can still wade wet with sneakers or felt-soled wading shoes, but you might prefer modern breathable waders for comfort. Also, a wading staff or a stout stick cut alongside the stream is useful. The water in these creeks is seldom as clear as it is in a trout stream, and a staff will help keep you from stumbling or stepping into an unseen hole. A lot of the bigger fish are likely to be in pools, but don't neglect shallower riffles where there are rocks and deeper pockets. Some good fish hang out there, too.

After my nostalgic discovery, I put that old tackle back into its corner with the mole crickets, but I left the Herter's rod out (where I'm sure to stumble over it one day). I'm thinking it's been far too long since the two of us went creek fishing.



REED GOODWIN-JOHANSSON

OUTDOOR MOMENT

Horseshoe crab shell at Oak Island

IN THE SEPTEMBER ISSUE

JARED LLOYD

CONSTANT CHANGE
Natural processes powered by storms allow North Carolina's barrier islands to survive throughout eons.

BUILDING BLOCKS
Inmate labor in Caswell County has reduced the time and expense of building boating access areas.

WET WONDER
Anglers feel a special kind of kinship with the water that never goes away, even when they aren't fishing.

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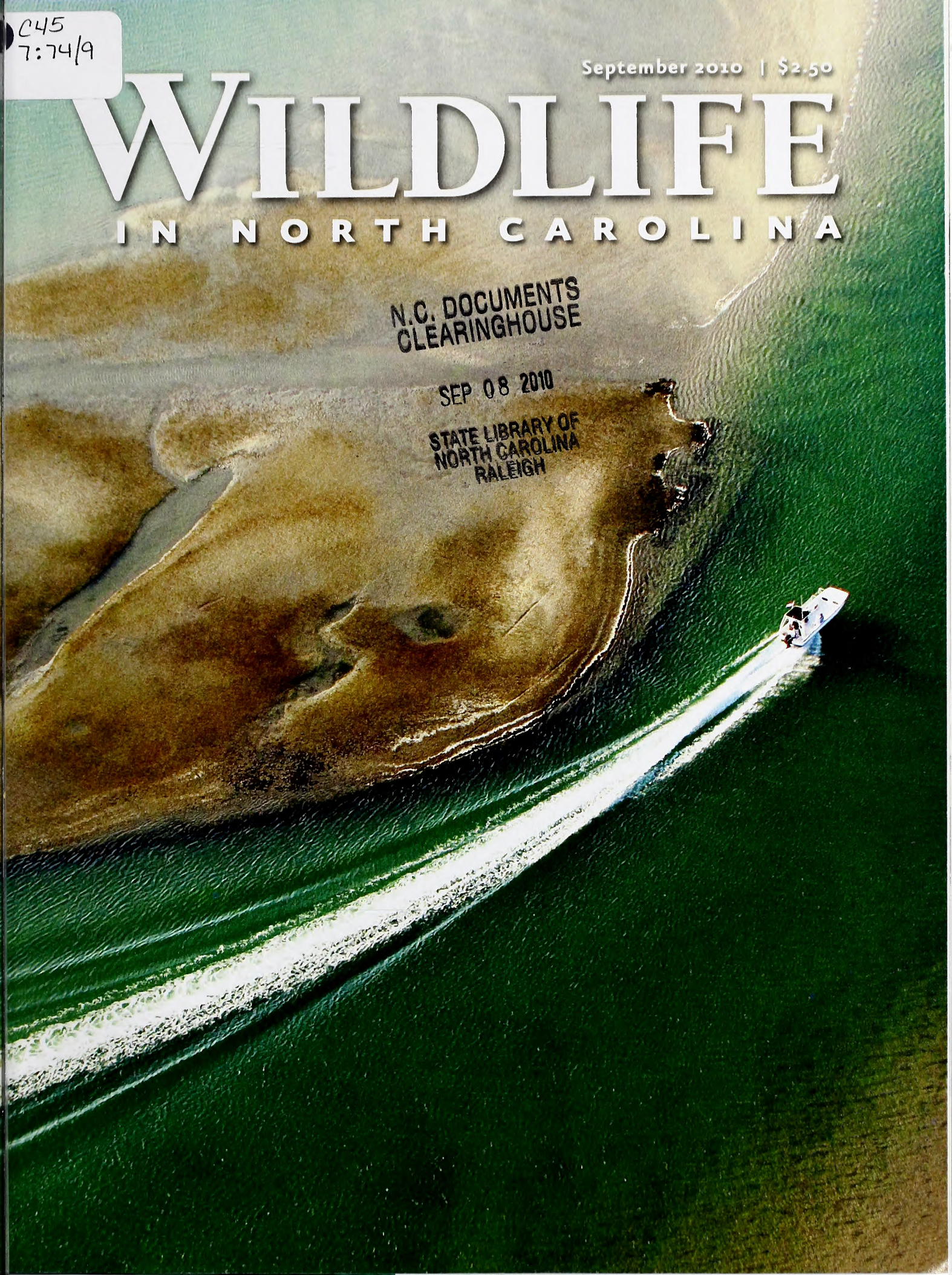

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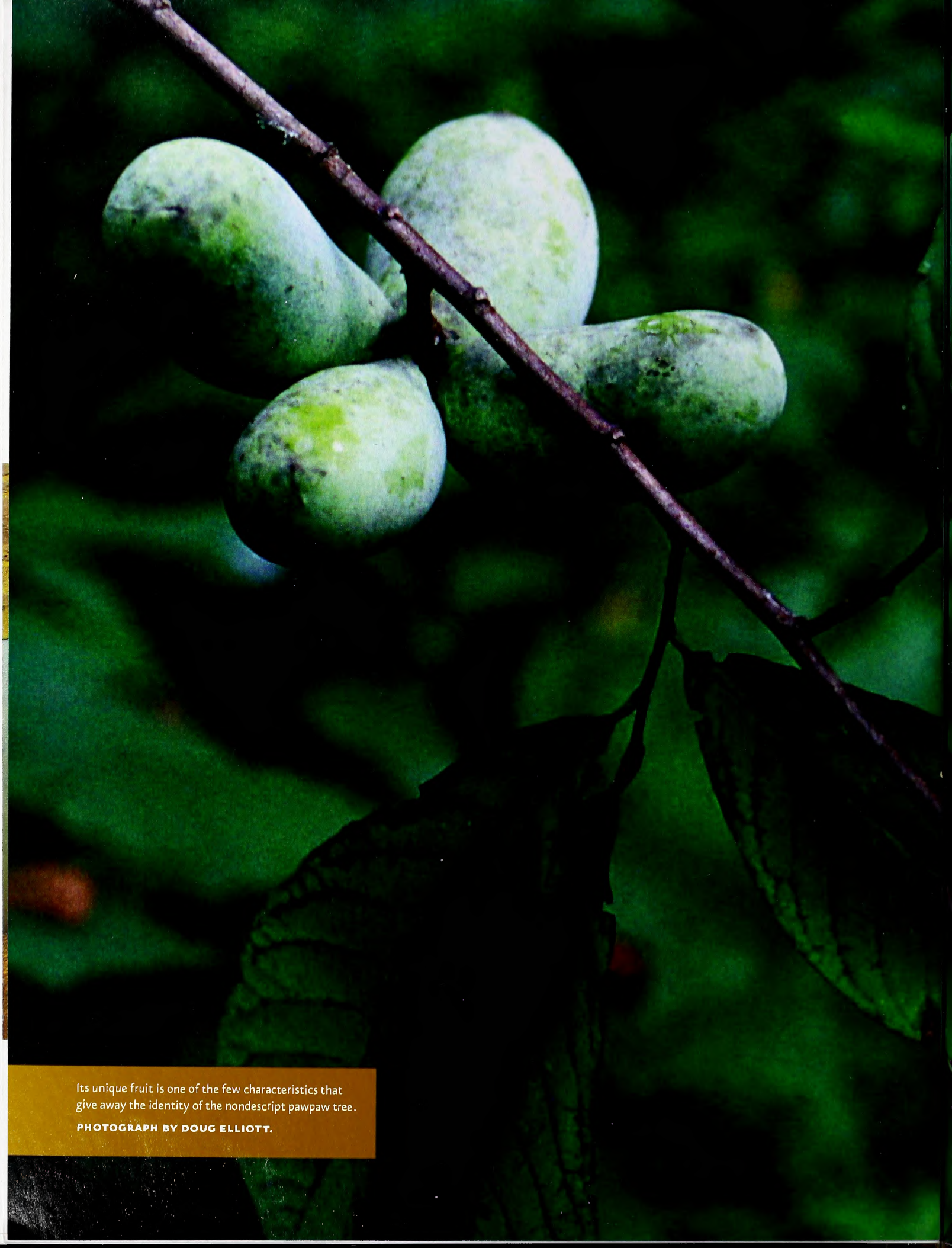

Its unique fruit is one of the few characteristics that give away the identity of the nondescript pawpaw tree.

PHOTOGRAPH BY DOUG ELLIOTT.

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Cover: North Carolina's barrier islands persist despite constant sea level rise because of geological processes that began at the end of the last Ice Age. PHOTOGRAPH BY JARED LLOYD.

Wildlife in North Carolina is the official educational publication of the North Carolina Wildlife Resources Commission. It is dedicated to the sound conservation of North Carolina's wildlife and other interrelated natural resources and also to the environment we share with them.

EDITOR'S NOTE

On the North Carolina coast, wind and water are our constant companions and adversaries. They cool us in the summer and enable us to sail our boats—but they also lash out at times, uprooting things we would prefer to stay rooted.

Photographer and naturalist Jared Lloyd explains in "Shifting Sands" (page 26) how wind and water influence the migration of barrier islands such as the Outer Banks. It turns out that these thin strips of sand are not fragile, as many people assume. Only the things that people have built on them are fragile. The Outer Banks are relics of geological processes left over from the last Ice Age—processes that allow the islands to exist and persist, as long as no one tries to stop them.

JARED LLOYD

But of course, we always try to stop them. To protect homes built on the beachfront and roads running behind the first line of dunes, we sacrifice the very sand on which these structures are built in our attempts to hold back the ocean. We know that the sea will win eventually, but we place our short-term happiness before logic. The appeal of the coast muddies our thinking. We are compelled to do everything humanly possible to get close to the water.

Associate editor Jim Wilson gives a lot of thought to the allure of water in "Streams of Consciousness" on page 14. From his angler's perspective, water calls to us on some primordial level beyond our understanding. It promises beauty and tranquility, virtues that can often be in short supply. That's at least part of the reason we are willing to sacrifice money, time and energy (and occasionally, safety and common sense) to be near the water.

The N.C. Wildlife Resources Commission has long understood that people want to be in, on and around the water. In recent years, the agency has redoubled its efforts to provide boating access areas on waterways across the state. The commission even partnered with a prison, employing skilled inmates to construct docks and propagate plants used to complete these access areas. As Carolyn Rickard explains in "WISe Guys" (page 10), this is a rare feel-good project in difficult economic times because it saves money and gets the work done faster. And anything that can get us on the water faster has got to be a good thing.

Greg Jenkins

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Yackety 'Yak

I wanted to thank you and Mark Patterson for bringing the exciting and relatively new sport of kayak fishing to *Wildlife in North Carolina* magazine ("Kayaking for Kings," July 2010). I have been kayak fishing for 8–10 years now and have enjoyed many aspects of this sport: the tranquility of an early morning paddle, the challenge to catch larger fish on a smaller boat, the versatility of fishing for various species in fresh water and salt water, the flexibility in launch sites, and the friendships established through kayak fishing clubs and tournaments.

Kayak fishing is growing quickly in popularity throughout the world. Everywhere, new fish species are being sought from kayaks and everyone is still learning and opening new areas for others to experience it. A great example of that is the article on king mackerel fishing in the July issue. Mark Patterson shares all the secrets to targeting these kings just offshore and allows other kayak fisherman to follow his suggestions, so they can experience that exciting "saltwater sleigh ride." I have been on a few saltwater and freshwater sleigh rides in my kayak and it always reminds me of the book "The Old Man and the Sea" by Ernest Hemingway. I have learned over the years that when you are in a small 13-foot kayak and a 15- to 35-pound fish comes calling, the peacefulness of a nice paddle turns quickly into excitement and chaos.

I have also learned over the years that safety and visibility on the water should be stressed when kayak fishing. Try not to kayak alone, write a float plan and leave it with someone, and make your kayak as visible as you can in daytime, dusk and dawn. Join a local kayak club like the N.C. Kayak Fishing Association (www.nckfa.org) and meet others that are interested in this sport. It is a great way to learn and avoid all the trials and errors. Finally, kayak fishing is a great sport that the entire family can enjoy and share the memories. Not only does it bring you new fishing opportunities, but the stealth nature of a kayak opens you up to many encounters with wildlife in the water, land and sky.

Jim Leisyl
Raleigh

Where Credit is Due

I enjoyed reading Jack Morton's personal reflections about the transition of Grandfather Mountain from a family business into a state park in the article "A Towering Legacy" (June 2010). I was dismayed, however, to find that the University of North Carolina at Chapel Hill Library was not credited for the photographs supplied to *Wildlife in North Carolina* to illustrate the article.

The readers of the article should know that the photographs (and in this case, the entire Hugh Morton collection of photographs and films) are here at UNC-Chapel Hill. I would appreciate it very much if you would let your readers know that the Hugh Morton collection is here, and that more than 6,000 of his photographs can be seen online at http://www.lib.unc.edu/dc/morton/.

Just as the Morton family shared Grandfather Mountain with the people of North Carolina as a state park, they donated Hugh Morton's photographic legacy to the North Carolina Collection Photographic Archive for all to use. Please help us share the news about this marvelous gift to all.

Stephen J. Fletcher, Photographic Archivist
North Carolina Collection
University of North Carolina
Chapel Hill

Slithering, Paddling, Swimming

We made a trio of errors in the July 2010 issue that we would like to correct. In "Reviving Raft Swamp Farms," the snake at the top of page 14 is a black racer, not a black rat snake. The black racer (*Coluber constrictor*) has smooth scales, but the rat snake (*Elaphe obsoleta*) has keeled scales, which means that there is a ridge running the length of each scale. These rough scales make the rat snake an excellent climber. The black racer climbs most often when pursued. When approached, a black racer will often flee quickly, while a rat snake will move away slowly or freeze.

In "The Many Faces of The Dan River, Part One," Hanging Rock Outdoor Center was listed on page 25 as a source for canoe rental. That business is now closed. Please see the second part of the story in the August 2010 issue for a more accurate list of canoe rental sources.

Finally, the Duane Raver illustration we used on page 37 with the Back Porch article "White Crappie Mark Broken Again" was a black crappie. The white crappie (*Pomoxis annularis*) has a deep-silvery body with shades of green or brown on its back. It has five to 10 dark vertical bars on each side, a whitish belly and five or six spines in its dorsal fin. The black crappie (*Pomoxis nigromaculatus*) is silvery-green to yellowish with many dark spots on its sides and fins, and seven or eight dorsal spines.

One reader who recognized the error said in an e-mail, "Duane Raver sure knows better." It's true. Duane called to let us know about the mistake.

write us

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Mill Pond *Memories*

COLUMBUS COUNTY'S CAPTIVATING MILL POND WAS HOME TO THE VENERABLE BRUNSWICK WALKING AND DRINKING CLUB AND STILL HOSTS A HUNTING CLUB TODAY.

COURTESY OF VINSON BOWERS

Once and again the stomping ground of wealthy sportsmen, The Mill Pond has hosted its share of festive gatherings. Above, a 1943 wedding party for Lawrence and Julia Bowers hosted by her father and mother, Ernest and Julia Vinson. The Vinsons (Ernest in dark shirt and tie with Julia leaning over him) are gathered around the now-vintage poker table that still sits in the "Big House" on the property. Below, a gathering of current hunt club members and guests (from left) Rick Edwards, Coke Gray, Jim Graham, Vinson Bowers, Jim Rabon, Loren Edwards, Rick Neisler and Carlton Williamson.

WRITTEN & PHOTOGRAPHED BY MIKE MARSH

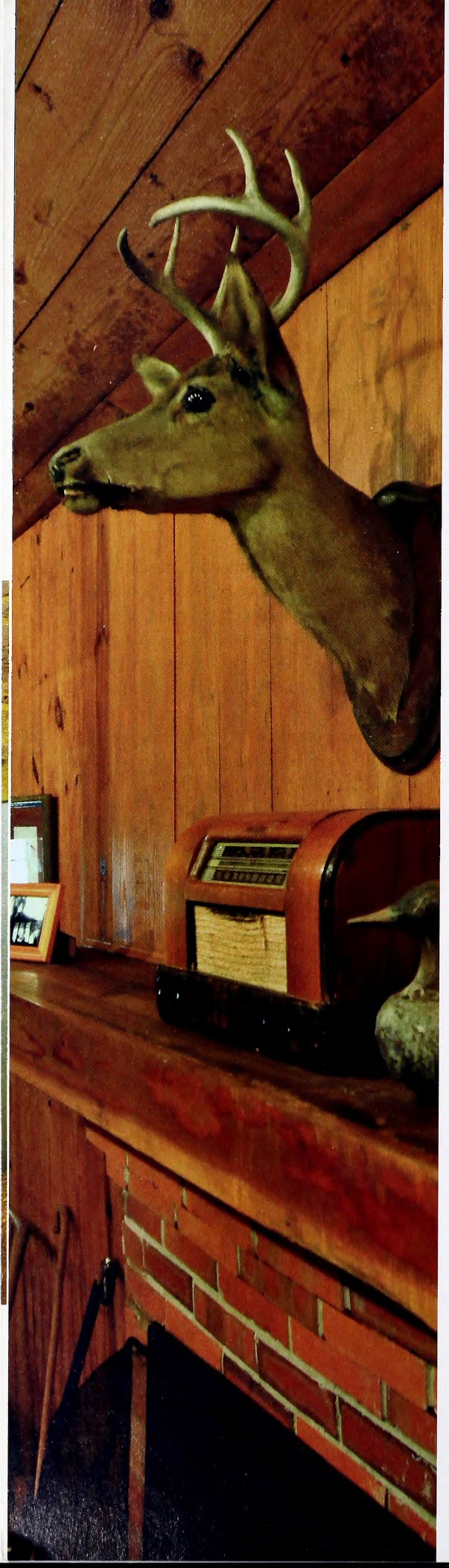
Just to the east of Whiteville, an oblong outline on a map of Columbus County highways indicates the location of a large pond. On the map, it looms large enough to appear to be some sort of public facility. But the casual visitor has to search hard to find it.

Further investigation will disclose a sign hailing Millpond Road, which rims a private pond bordered with tall trees. Though the trees make it difficult to see the water from the road, a historical marker beckons from the yard of a beautiful home overlooking the pond through what seems like acres of window glass.

The historical marker states that The Mill Pond was home to Julia and Lawrence Bowers from 1957 until 2004. It mentions that The Camp near the pond was erected as a fishing cabin, and that one of the oldest quail hunting clubs in the South was organized here. The Camp was once filled with the laughter of visiting dignitaries, including Ross Perot, Sen. Jesse Helms, Emile F. "Chick" du Pont and at least one Miss America.

Vinson Bowers once lived in the house with his parents. In the foredawn of a chilly winter morning, he is paddling a tiny aluminum johnboat across the slick surface of the tannin-stained water. Reaching the far end of The Mill Pond, opposite the clubhouse, Bowers untangles the anchor lines tied to a dozen ringneck and wood duck decoys and sets them in the water in front of a wooden duck blind.

For anyone who didn't know exactly where the blind was located, it would have been impossible to find in the dark without having



a GPS unit programmed with the location's coordinates. The blind is built so close to a stand of cypress trees that it appears to be part of the swamp forest stretching skyward from a tiny island. But Bowers has no trouble finding the blind because he knows The Mill Pond like it is his back yard. And in fact, for many years it was.

"This was a wonderful place for growing up," Bowers said. "We hunted ducks and fished for bass. My grandfather, Ernest L. Vinson, bought it right after the Great Depression. His daughter, Julia, was my mother. After a visit to China, she built a bridge with an Oriental theme extending from the bank near the house to an island in The Mill Pond."

On his way to the blind, Bowers had paddled beside the bridge. He had launched his boat from a bank armored with a concrete breakwater near the current guesthouse, which was once used as a storage building. The boat launching point is in front of the historic clubhouse, which hosted first the fishing club and later the Brunswick Walking and Drinking Club, as well as the distinguished visitors named on the historical marker.

NEW OWNERS, SIMILAR PURPOSE

The former Bowers home, which serves up spectacular views of The Mill Pond, is now the clubhouse for an exclusive membership list. The evening before heading out to hunt with Vinson Bowers, I had walked the planks of Julia's bridge with him, our footsteps disturbingly loud against the planks when compared to the whispered words of a group gathering at the gazebo on the apex of the bridge to witness a serene sunset gazing at its mirror image in the shimmering water.

Richard Edwards and his father, Rick, greeted their bevy of guests for one of The Mill Pond Hunting Club's winter hunts, which are always big social events. By dinnertime the crowd swelled to include 30 individuals. Some of the men came to eat, drink and make merry, and others such as Vinson Bowers came to hunt ducks the next dawn. The Edwardses now own The Mill Pond, having purchased it from the Bowerses in 2006, with an agreement in place that preserved for members of the Bowers family the right to use the facilities. Rick Edwards owns a worldwide business named Affordable Dentures. He lives in Whiteville, and Richard lives in Wrightsville Beach.

After Richard rode by the property and discovered it was for sale in 2006, he called his father. Once Rick Edwards saw it, he was so impressed that he leased it with an option to buy, followed by a purchase agreement. "Initially, we were considering developing the property for homesites," Rick Edwards said. "But it was so beautiful, we decided to preserve it to keep its historic perspective. Part of the goal is continuing to keep it in use as a hunting club."

As the curtain of darkness slowly closed on sunset's pastel show, Rick Edwards walked back across the bridge to the mainland and entered the former clubhouse, which now serves primarily as an entertainment area. The original woodwork is still intact, including the fireplace mantel, heart pine plank walls and floor, and row of libation lockers marked with antique brass nameplates. Bedraggled old deer heads, faded largemouth bass, and other hunting and fishing trophies hang from the walls as though displayed in a museum.

A leather-trimmed poker table harkening back to the 1920s begs for a sextet of players. Vinson Bowers opened a leather-bound wooden box to reveal the original poker chips and playing cards that he said probably came with the old table. But these game pieces of a bygone era are no longer used because they've become fragile with advanced age.

In the kitchen, an enameled gas stove waits to be lit for cooking breakfast. The original stove was wood-fired, and a hand pump provided water. The walls are lined with cast-iron cooking utensils, washboards and other tools of camp life from the late 1800s through the early 1900s.

But the home the Bowers family built is now the clubhouse proper. Rick Edwards calls it the Big House. "We have eight members, and each member has his own bed in the Big House," Rick said. "A member simply calls ahead of his arrival, and people come in to prepare for his visit. If he has any guests, they stay in the guesthouse. Once the member leaves, the service crew returns to put everything back in order. We have our biggest gatherings during our September dove hunts and at Christmas. But we also have a spring social gathering and other social events that include live music, horse carriage rides and other festivities. Social events have always been a big part of The Mill Pond's history, with events benefiting civic groups such as the Columbus County Arts Council."

The Mill Pond property has 183 acres, including the 68-acre Mill Pond proper. But the hunting club also leases adjoining

COURTESY OF VINSON BOWERS

"Initially, we were considering developing the property for homesites . . ."

properties from other landowners. Richard Edwards oversees the planting of fields for dove hunts and the building of hunting blinds for ducks and tree stands for hunting deer, as well as looking after the maintenance of the buildings and grounds.

"We hunt deer, turkeys, ducks and doves primarily," Richard said. "We have a trophy management plan in place for deer and are seeing the results with some heavy-racked bucks. For our members, the hunting is a truly relaxing experience. But sometimes for me, it's also lots of work, especially maintaining the duck blinds. But I really enjoy doing it all, so I appreciate anything that is an excuse for being here."

AN INDUSTRIAL PAST

The Mill Pond wasn't always a sportsman's paradise. Freed slaves built the pond to provide water for a cotton mill, which was later converted to a gristmill. Capt. Van Valentine Richardson built The Mill Pond for the millworks just after the Civil War. Richardson was born in a house on what is now Millpond Road. He became a second lieutenant in the Columbus Vigilants, which became part of the 18th Regiment North Carolina Troops in the Confederate army. Following the Civil War, he served as sheriff of Columbus County and was elected to the North Carolina legislature in 1872. His benevolent works included serving on the board of the N.C. School for the Deaf and Dumb. His many business interests included the founding of Richardson Cypress Lumber and Shingle Company, which

COURTESY OF VINSON BOWERS

"... But it was so beautiful, we decided to preserve it to keep its historic perspective. Part of the goal is continuing to keep it in use as a hunting club."

Things have changed little in The Mill Pond's original clubhouse (seen in the two black-and-white photos and opposite) over the years. The knotty pine paneling still looks good, but the deer mount is showing its age. Lawrence Bowers built what is now known as the "Big House" (top left) for his family in 1958.

Above, Vinson Bowers hunts waterfowl from a well-hidden blind on The Mill Pond. Opposite, views of the old clubhouse's kitchen in 1943 and today, and an outdoor meal from the same two eras.

supplied materials and machinery across the United States.

The Mill Pond was sold to Jackson Brothers Lumber Company in 1925, and the new owners built a large cabin on the property to use as a fish camp called, succinctly, The Camp. The Mill Pond then served as a water source for a steam-powered sawmill. In 1928, during a period when North Carolina's quail hunting earned nationwide renown, the fish camp became a quail hunting camp for the Brunswick Walking and Drinking Club. At the time, the mill village built by Jackson Brothers to house its workers was named Brunswick, so the club took on the village's name.

Vinson Bowers said the formal hunts began when Ernest Vinson, who was associated with the lumber company, telephoned four Delaware hunters to invite them to participate in a quail hunt. Josiah Marvel, Sid Scott Sr., Chick du Pont and George Weymouth, all of Wilmington, Del., drove to Baltimore in Scott's black sedan and boarded a ferry. After crossing the Chesapeake Bay, the hunters disembarked in Norfolk and drove to North Carolina, taking U.S. 17 to Wilmington and then driving across New Hanover and Brunswick counties into Columbus County.

The hunters reveled in the bountiful quail hunting, using local guides and dogs. Joe Carpenter of Wagram trained the English setters and served as the hunt master. The visiting sportsmen stayed an entire week, with the evenings spent winding down at The Camp in front of the brick fireplace. Relaxation included card games.

The Great Depression resulted in the demise of Jackson Brothers Lumber Company. In 1932 Ernest Vinson, W. T. Sledge and I.C. Brown bought several tracts of land including The Mill Pond and the sawmill at a bankruptcy sale. Vinson was an avid hunter and fisherman. He and his daughter, Julia, often fished The Mill Pond from a skiff. Vinson bought out his business partners in 1934 and divided the holdings but retained possession of the Mill Pond and some adjoining property. Julia Vinson married Lawrence Ray Bowers in a garden ceremony in 1941. Ernest Vinson served as mayor of Brunswick for many years and was very active in the Whiteville community.

"In those days, quail hunting was a sport reserved for gentlemen," Vinson Bowers said. "These gentlemen returned for the next 28 years to renew their Southern bird-hunting ritual. It was over this time that my grandfather, who was nicknamed Admiral, and these Delaware sportsmen began referring to the 'assembly of the clan' as the Brunswick Walking and Drinking Club. Brunswick was their mecca, walking was very much a part of quail hunting and the years of extraordinary friendships were celebrated over tumblers filled with rare single-malt Scotch whiskey."

Bowers said the Brunswick Walking and Drinking Club was made up of wealthy Northern industrialists and their Southern counterparts. Delaware residents du Pont and Weymouth were involved with E. I. du Pont de Nemours and Co., Scott with Continental Can Company Inc., and another member, Bill Denham of Philadelphia, with General Motors Corporation. Southern members included H. Bruce Thomson of the Coca-Cola Bottling Co. in Lynchburg, Va., and Dr. Richard Whitaker from Whiteville.

The club members did not limit their adventures to North Carolina bobwhites. Bowers said other assemblies of the clan included spring tarpon fishing trips to the Boca Grande, Fla., winter home of the du Ponts. In July the group headed for Canada to fish for brook trout from a lodge known as Arnold's Bog. They also hunted wild turkeys in Hickory and ducks on the Delaware River.

"My father, Lawrence Bowers, was not a hunter," Vinson Bowers said. "However, the

Other than the changing of the guard to the sounds of industry and commerce, nothing has changed across the timeless face of The Mill Pond,

COURTESY OF VINSON BOWERS

except for the age of our gentleman guide Vinson Bowers, who has plied its waters for the better part of half a century.

COURTESY OF VINSON BOWERS

hunting tradition was carried on by my brother Larry and me, when my father built our home in 1958 overlooking The Mill Pond. Boney Architects of Wilmington designed what we now call the Big House. We had some great duck hunts through the 1980s, until we moved too far away." Lawrence Bowers became CEO of Waccamaw Bank, which became United Carolina Bank and then BB&T. Traditions carried on after the end of formal hunting included entertaining Whiteville society, civic organizations and people involved in the financial business.

STILL A CLASSIC

The squealing calls of a wood duck hen announce the arrival of shooting time. Five wood ducks decoy, leaving two behind. Moments later, a pair of ring-necked ducks decoy, and only one flies on.

As the yawning sun winks awake through Spanish moss lace festooned among the cypress and black gum limbs, signaling quitting time for ducks and duck hunters, Vinson Bowers paddles out across The Mill Pond to retrieve his decoys.

The banging-and-thumping goings-on at the loading dock of a discount store in nearby Whiteville tell just how closely the modern world has encroached upon The Mill Pond. But the noise is probably equal in decibels to the puffing and clanging of the long-gone steam-powered lumber mill. Other than the changing of the guard to the sounds of industry and commerce, nothing has changed across the timeless face of The Mill Pond, except for the age of our gentleman guide Vinson Bowers, who has plied its waters for the better part of half a century.

"Once you've been on it, The Mill Pond captivates you forever," he said. "It's such a beautiful place." ⬘

Wilmington writer Mike Marsh is a regular contributor to Wildlife in North Carolina.

An inmate construction and horticulture program has **INCREASED THE EFFICIENCY** and **REDUCED THE COST** of building boating access areas **ACROSS THE STATE.**

WISe GUYS

It's a challenge to think this 6,000-square-foot aluminum building once stood empty. Today it's abuzz with activity: saws sawing, hammers hammering, drills drilling. Soon the stacks of neatly sawed wood at one end of the shop will be docks and piers, ready for installation at one of North Carolina's boating access areas or public fishing areas.

"We have a lot of work going on in here, and it's very efficient," said Sam Seamster, who oversees the manufacturing facility at Dan River Prison Work Farm. "Basically, when we got here, there was not a thing in this building. We had to set up a shop environment, and everything we set up here, the inmates did. The inmates did the work."

As it happens, Dan River inmates are doing a lot of work for the N.C. Wildlife Resources Commission. Through the 4-year-old Wildlife Inmate Service program, or WISe, inmates build docks and piers that are installed across the state. They also cultivate trees, shrubs and small plants, which are sold to schools, municipalities and other public agencies. Finally, a handful of highly skilled inmates work in WISe's sign shop, making the diamond-shaped logo signs seen at boating access areas across the state, along with other custom signs.

It's an average Tuesday morning, and a dozen inmates in white shirts and green trousers file off a bus into the barn-like structure. Without hesitation, they pick up tools and begin assembling what looks like a floating dock. Laughter erupts every few minutes as they nail boards together, saw and drill.

Chris Heath is one of the inmates. A carpenter for 17 years, he knew on his first day at Dan River that he wanted to take part in WISe. "It makes the time go by faster, for one thing," said Heath, who has since been released. "The first thing my father said to me when I came here was, 'Keep

WRITTEN BY CAROLYN RICKARD
PHOTOGRAPHED BY MELISSA MCGAW

"A lot of times we'll get an inmate in here who has manual dexterity but doesn't know a lot about carpentry."

Page 10: Inmate James Barber tends to buttonbushes that will be used for landscaping at boating access areas or other state properties. Page 11: (From left) Thomas Seagle, Michael Harrell and Keith Siddle build a section of a dock that will be placed on a flatbed truck, delivered to a boating access area under construction, and installed there. This page: Dock sections constructed at the Dan River facility are installed by Wildlife Commission boating technicians (from left) Adam Parrish, Doug Robertson and Charles Gibson. Seagle works with a circular saw while Joseph Woods and James Howell build a sign for an access area.

your calluses up.' And I haven't gotten rusty, that's for sure."

In addition to the docks, the inmates do custom work. They've built wildlife observation piers for Jordan Lake and Lake Raleigh. They also build gazebos and information kiosks, along with smaller items such as birdhouses and a speaker's podium.

"A lot of times we'll get an inmate in here who has manual dexterity but doesn't know a lot about carpentry," Seamster said. "They'll end up learning a lot about framing, for instance, that they can use when they are released."

The work not only helps the inmates, it's a boon for the Wildlife Commission's Division of Engineering Services, which has the lofty goal of building dozens of new boating access areas and renovating many of the more than 200 areas that already exist. A dock would take two workers two weeks or so to build on-site. But with 10 to 13 inmates working at one time, a dock can be built at the manufacturing facility and on its way to a site in a fraction of that time. The speedy work allowed the commission to build or renovate more than 20 boating access areas over the winter of 2009.

"It's very efficient," Seamster said. "They start with the basic framing toward one end of the building, and as they move closer to having it done, they move the dock closer to the door. When it gets to the door, it's ready to be loaded up and go to a site." The docks are built upside down so the workers can affix floats to the bottom.

Some 17 percent of inmates at the minimum-security Caswell County facility enter the WISe program, usually in the months immediately before their release. And since the workshop sits outside Dan River's high, locked fences, only the best-behaved prisoners have the opportunity. Certain crimes, such as rape or assault on a female, will immediately disqualify a prisoner, said Jerry Powell, the correctional officer assigned to guard the workers. Often, prisoners with previous experience in carpentry are chosen.

For the prisoners, the program serves as an incentive of sorts for good behavior — before they even begin building or planting. "We try to select the best and bring them down here," Powell said. "They are able to get off the unit and start a product and see a finished product. They also get time off their sentence, and it gives them a sense of teamwork."

If the inmates show drafting talent, they can work in the Dan River sign shop. Two inmates work at any given time, creating aluminum signs using computer programs, a vinyl cutter and other equipment. The inmates can make a sign within two weeks, and for 25 percent less than

"They'll end up learning a lot about framing, for instance, that they can use when they are released."
– Sam Seamster, WISe facilities manager

the commission could buy it from an outside source. Products range from the "No Wake Zone" signs seen on waterways to the "Handicapped Parking" signs in parking lots.

In the horticulture program, inmates grow 33 species of plants from all three regions of North Carolina. The commission uses some of the plants to landscape buildings, boating access areas and similar sites, and uses others for stream restoration projects. The rest are sold to outside agencies.

The first week of horticulture training takes place in a classroom inside the prison's walls. Then Powell and the prisoners board a bus and travel down the dirt roads of the Dan River property to get their hands dirty in the fields. There, pots holding young trees stand in neat rows with irrigation tubes running between them. By this fall, all 6,000 plants the inmates grow will be either sold or used by the commission.

In 2008–09, WISe horticulture used or sold 2,500 plants ranging from river birches to silky dogwoods. All are grown at the Dan River site, in acres of fields outside the prison fence, from bare rootstock from various sources including the Division of Forest Resources. Cultivating genetically native plants, which are unavailable in needed quantities from commercial sources, has been key to the program's success. Instructor Sam Cobb works for Piedmont Community College, which partners with the N.C. Department of Correction to offer the 280-hour continuing education horticulture class at Dan River. "We experiment a lot, trying different methods and seeing what works and what doesn't work," Cobb said.

Last year the students experimented with persimmon seeds, which have a hard seed coat and can't be grown without altering the seed coat to allow water in. Cobb gathered seeds found in fox droppings, since the animal's digestive processes soften the seed coat. The inmates manually filed other persimmon seeds and compared them to see which ones grew better. The inmates also planted and cared for 300 button bushes from seeds and planted a vegetable garden last summer, which yielded watermelons, cantaloupes, corn, cucumbers and squash. The inmates ate their harvest.

There is evidence that WISe might help prisoners once they are released. Heath, the former inmate in the carpentry program, said he planned to seek work building decks and boat docks on Jordan Lake. And Cobb said his horticulture students try to find jobs working with plants. "I've gotten letters from inmates asking to use me as a reference," he said. "They wanted to get a job in a nursery."

Carolyn Rickard is a public information officer with the N.C. Wildlife Resources Commission.

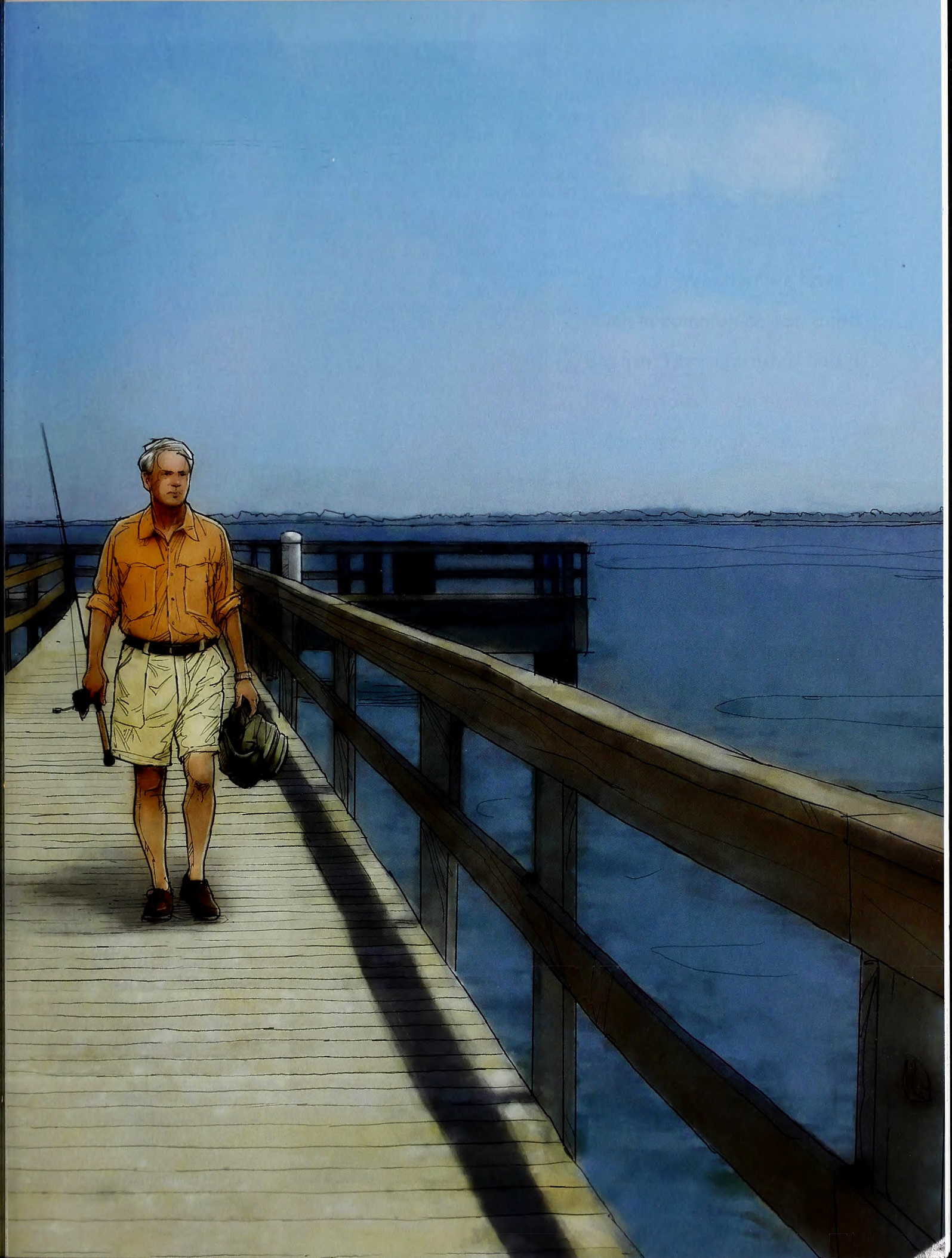
Dwight Martin creates a sign in the prison's sign shop while Joshua Lewis cuts board for dock sections. Terrel Jefferson pots maple seedlings before placing them outside for cultivation.

STREAMS of Consciousness

Water beckons, calling us to seek not only fish, but also the riddle of ourselves.

Fishermen know the ways of water. Having been born in kinship with it, we feel water coursing through our bodies, and we embrace its familiar pull and push as we once did in dark, prenatal dreams.

Perhaps that kinship is the reason our eyes linger on each stretch of water we pass, searching in a few seconds for the key to decipher the riddle of something both foreign and familiar. Each piece of water—a tiny mountain trout stream or a dark, sluggish coastal river—promises adventure, or at least respite from the everyday.



Water entices us to explore new places, bids us return to the old. Water whispers of possibilities outside time, of locations where people are few, land is beautiful and fish are plentiful and willing. We have only to surrender.

Sometimes water's entreaties must be ignored. We fishermen are, at least in our own minds, virtuous, pragmatic men who must tend to jobs, yards and dozens of broken or malfunctioning thises and thats that require many trips to the hardware store—some of which are necessary. Then one day we will set aside the chores (Why try to finish that which has no end?), pack up our gear and begin a journey. Perhaps it will be one warm, high blue fall day when the only way to rid our minds of the faint sound of burbling water is to seek out its source and hear it close, see it for the beautiful thing it is, feel it swirl cold and comforting about our legs. We smile at the moment we marry desire and reality and wonder why we delayed so long.

Once in Hyde County, I spent the day on Lake Mattamuskeet with a couple of biologists sampling largemouth bass. We throw a switch on the electrofishing gear, and the water blooms white as stunned fish float belly up among the cypress knees. I net them as quickly as I can, but I'm an electrofishing neophyte. Sometimes the fish recover in a few seconds, flip their tails and disappear into the shallow brown water before I can net them. We have no interest in collecting the carp and jumping mullet that drift among the bald cypresses that line a submerged canal.

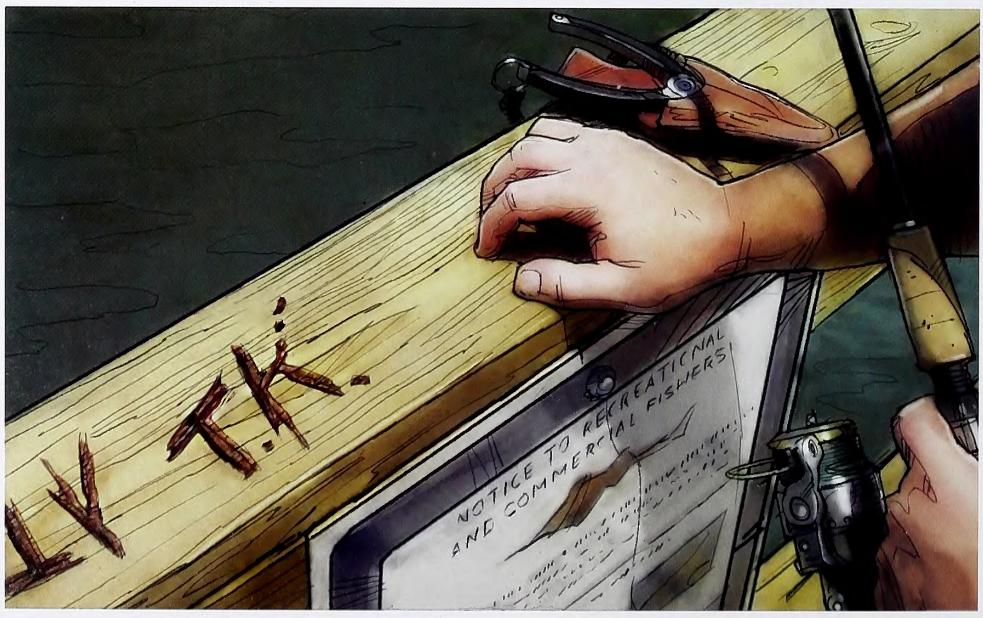
We measure, weigh and identify each fish, then return it to the water. If we dawdle, perhaps discussing some oddity about a particular fish, sometimes the very small ones, those only an inch or so long, will die. Only two or three of them die on this run, and we measure and weigh them, too, then toss them to the water, food for other animals in a chain of eating. They drift with the wind, and if you look very hard, you can see the orange bellies of the tiny pumpkinseeds a few feet away.

After eight hours on Mattamuskeet, I could still feel the tug of water. Much of Hyde County is water, and that, along with the fact that the mosquitoes outnumber the people by the millions, makes it nearly perfect for a fisherman who hasn't forgotten his insect repellent.

So I drove west, past houses with faded, broken-down cars abandoned at cockeyed angles in the yards. I wonder what finally broke them for good, what took the life from these big, rusted hunks of *De*-troit steel. After so long they become unintended yard ornaments, testaments perhaps to both frugality and inertia. From the two-lane highway, I turn south down a long dirt road, pushing dusting bobwhites before me, to the Pamlico Sound, a piece of water so large that upon seeing it in 1524, Italian explorer Giovanni da Verrazano mistakenly believed he had reached the Pacific Ocean. The sound, with its shoals and storms, is dangerous. Good men die here. Today the sound's green-gray water is white-capped from a stiff westerly wind that is still freshening.

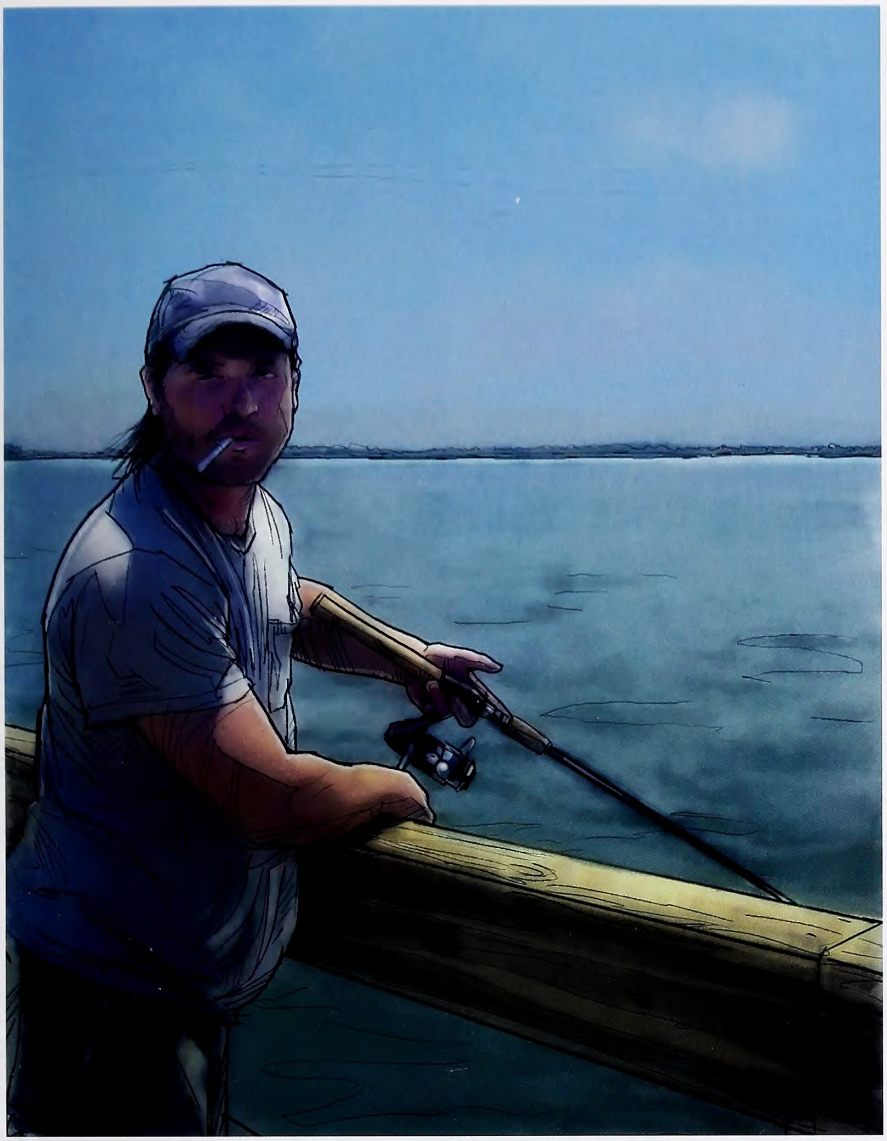
I am alone and happy on the pier. **It is my own personal piece of water.** If I have to share it eventually, I will still have the bright moments when it was mine alone.

At the end of the dirt road, a 1,000-foot wooden pier pokes into the sound. Periodically, storms have ripped the structure apart, and after several years, the U.S. Fish and Wildlife Service has rebuilt it. I take a 7-foot spinning rod loaded with 17-pound test line onto the pier. It's too big for what I'll be fishing for, but with the wind, I want to throw a heavy lure to get any casting distance. Besides, I'm not sure that catching fish is my purpose.



I am alone and happy on the pier. It is my own personal piece of water. If I have to share it eventually, I will still have the bright moments when it was mine alone. I'll keep that image, for it seems the best images often are those in which the company is sparse.

Although the rebuilt pier is only a couple of years old, blotches of fish blood and scales mark this as a place where meat fishermen come. Anglers have scratched their initials into the railing,



After a few casts, a sizeable fish smacks at the lure, flashing its sides like silver shards, but mistimes its attack. "Could you see what it was?" I ask as I approach. **Whether we have much in common or not, a fish is a fish; I am interested and a little envious.** I wonder if I have a Zara Spook in my tackle box.

souvenirs for others to speculate upon until the next big blow picks up the pier and deposits its pieces into the sound and marshes.

A plastic jerk shad with a 3/8-ounce jig head is already tied onto my line, so I cast it, bumping it through a grass bed. Each cast catches nothing except pieces of grass, which I pick off and toss up into the wind. I cast repeatedly and work my way to the end of the pier, which ends in a "T." I make one more cast, just to say that I have fished the length of the pier—as though there were some prize for persistence—then set down my rod, prop my foot on the railing, and watch and listen. The wind is blowing hard enough that it makes my fishing shirt flap and pop. Waves smack against the pilings. Time slows, and the number of things I care about diminishes.

Despite the wind, I can hear the bobwhites calling. *Bob-white, bob-white, bob-bob-white*, always a happy sound, and the quail talk makes me think of dogs and men and years long gone. I hope they all can hear what I hear, but I'm not as certain of life beyond life as I once was. I want it to be so, but years have a way of belying beliefs. What I have trusted sometimes has turned out to be false; what I doubted, true; what I longed for, disappointing. Perhaps as we age, we, like water, seek the paths of least resistance, the ones most likely to keep us from hurt and harm. We settle for the anemic comfort of the everyday, fearing the difficult road where dreams would lead us.

The aloneness is perfect, that state of being without people and without the ache of loneliness. I begin to count the friends I know who would love this day in this place, right at this very moment. It's not a long list, yet neither is it too short. They are the people who would recognize the day for what it is without feeling the need for definitions.

A raucous, cawing fish crow wings east, and I watch him fly away with a gap in his tail where he's lost a feather. A truck door slams, accompanied by the dying sound of a radio tuned to a country station playing Toby Keith. I watch a man get out and walk onto the pier. The quail have fallen silent, and now I am no longer alone to listen to the water. I pick up my rod and head in, telling myself that the wind is too strong for good fishing.

My fellow angler is a 30-ish fellow, with an ample belly that I suspect is still years away from attaining its full glory. He sports a mullet hairstyle the likes of which I haven't seen since the early 1990s.

We are not alike at all, I decide, won't have much in common, but I stop at a distance and watch him rhythmically cast a Zara Spook, making the lure "walk the dog" from right to left and back again on his retrieve.

After a few casts, a sizeable fish smacks at the lure, flashing its sides like silver shards, but mistimes its attack. "Could you see what it was?" I ask as I approach. Whether we have much in common or not, a fish is a fish; I am interested and a little envious. I wonder if I have a Zara Spook in my tackle box.

"Speckled trout," he said.

"Looked like a nice one."

"Yeah," he said and smiled. "He missed the lure; he just wasn't there when I set the hook. Got nothing but water."

"Good fish, though," I said. "If there's one, there's bound to be more." *Well, Jimbo,* I think, *let's drag out another cliché. That the best you can muster?* It is trite, but, hell, it's also true. That fish couldn't have been the lone speckled trout in this piece of Pamlico Sound. Fishermen, when they speak while fishing, rely on clichés. The familiar need no explanations; another fisherman knows what is meant and can embellish the cliché with his own memories.

The mulleted fisherman turns back to the water and begins talking as he casts. "I haven't been here for a while," he said. "I grew up just down the road toward Swan Quarter. Live in Ohio now but came down to see my mama and daddy. They're getting on."

He casts repeatedly without success, but he is an experienced fisherman. After reeling in his lure, he quickly lights a cigarette and casts again, sure, as I would be, that a fish is just seconds away from a hookup. But he has no luck. Maybe that was the only speckled trout here, or at least the only one with an appetite.

"I used to spend a lot of time here, and I couldn't be here now and not come to this place." He casts again, and the comforting sound of "z"s spills from the reel as the line whizzes through the guides and out into the sound.

"You come here much?" he asks.

"No," I say. "Always plan to stop, but seldom do—too busy, too much in a hurry to get somewhere else. Always had some reason. Couldn't tell you a one of them now."

He looks toward the end of the pier, shakes his head, and from the brief smile on his face, I know he, too, has passed by good water for reasons that might have seemed legitimate but are now lost in the debris of remembering.

"No telling how many fish I've not caught by rushing by places," he says through cigarette smoke. "Story of my life."

We stand silently for a time, listening to the wind, the water, waiting for that one fish. There is no harm in fishless days, but even one landed fish on a tough day can be more of a prize than a dozen on another, better day.

"Well, I'll let you get back to fishing," I say. "It was nice talking to you."

We don't shake hands—he's still busy casting—but I wave "so long" and walk toward the truck, sure again there is a bond of brotherhood, fleeting as it may be, that binds fishermen. I don't know why I forget that. We know things. Sometimes we are unable to explain what we know or even lack the desire to make words take the place of the rhythm and the beauty of water and the fish that glide below its surface.

For a couple of moments, I sit in the truck and watch the fisherman, the wind blowing his dark hair as he hunts fish alone. I crank the engine and head back down the dirt road, once again scattering bobwhites. I can still almost hear the Pamlico murmuring its sweet, familiar promises as I put distance but not space between myself and water. ◆

Jim Wilson is the associate editor of Wildlife in North Carolina *magazine. Contact him at jim.wilson@ncwildlife.org.*

A truck door slams, accompanied by the dying sound of a radio tuned to a country station playing Toby Keith. I watch a man get out and walk onto the pier. **The quail have fallen silent, and now I am no longer alone to listen to the water.**

North Carolina Hunting Seasons 2010–2011

SPECIES		HUNTING SEASON	DAILY LIMIT	POSSESSION	SEASON
BLACK BEAR		*See Regulations Digest, P. 44*	1	1	1
DEER[1]			6	6[2]	6[2]
	Bow and Arrow	Sept. 11–Oct. 1 (Eastern) Sept. 13–Oct. 2 and Oct. 18–Nov. 20 (Western) Sept. 11–Oct. 29 (Central) Sept. 11–Nov. 5 (Northwestern)			
	Muzzleloading	Oct. 2–Oct. 15 (Eastern) Oct. 4–Oct. 16 (Western) Oct. 30–Nov. 12 (Central) Nov. 6–Nov. 19 (Northwestern)			
	Gun	Oct. 16–Jan. 1 (Eastern) Nov. 22–Dec. 11 (Western) Nov. 13–Jan. 1 (Central) Nov. 20–Jan. 1 (Northwestern)			
	Urban Archery Season	Jan. 15–Feb. 19			
WILD BOAR		Sept. 13–Feb. 28[3]	1	1	2
WILD TURKEY	Male Or Bearded Only Youth Hunt (Male Or Bearded Only)	April 9–May 7 April 2	1 1	1 (Annual bag limit is 2 wild turkeys)	2
EARLY CANADA GOOSE SEASON		Sept. 1–Sept. 30	15	30	None
DOVE	(Mourning & White-winged)	Sept. 4–Oct. 9 (noon until sunset on Sept 4; thereafter, shooting hours are ½ hour before sunrise until sunset) Nov. 22–Nov. 27 Dec. 18–Jan. 14	15	30	None

VIES		HUNTING SEASON	DAILY LIMIT	POSSESSION	SEASON
RAILS, MOORHEN & GALLINULE	Moorhen & Gallinule	Sept. 4–Nov. 12	15	30	None
	Clapper Rail, King Rail	Sept. 4–Nov. 12	15	30	None
	Sora Rail, Virginia Rail	Sept. 4–Nov. 12	25	25	None
EARLY TEAL SEASON[4]		Sept. 11–Sept. 29 (east of U.S. 17 only)	4	8	None
COMMON SNIPE		Nov. 12–Feb. 26	8	16	None
WOODCOCK		Dec. 31–Jan. 29	3	6	None
RED & GRAY SQUIRREL		Oct. 18–Feb. 28	8	None	None
FOX SQUIRREL		Oct. 18–Dec. 31 (only in 23 counties; season closed elsewhere; see *Regulations Digest*, P. 56)	1	2	10
RABBIT Including Box Trapping		Nov. 20–Feb. 28	5	None	None
QUAIL		Nov. 20–Feb. 28	6	12	None
RUFFED GROUSE		Oct. 18–Feb. 28	3	6	30
PHEASANT Male Pheasant Only		Nov. 20–Feb. 1	3	6	30
RACCOON & OPOSSUM[5]		Oct. 18 (sunrise)–Feb. 28	No restriction on opossum; see *Regulations Digest*, P. 55, for raccoon		
BOBCAT[5]		Oct. 18–Feb. 28	No restriction		
FOX		Nov. 20–Jan. 1 and Jan. 1–Jan. 22	Limited to certain counties, see *Regulations Digest*, P. 56		
MIGRATORY WATERFOWL		Federal regulations may be obtained at www.ncwildlife.org or by calling toll free 1-800-675-0263 after Labor Day			
COYOTE		No closed season or bag limits. Electronic calls allowed			
GROUNDHOG		No closed season or bag limits			
NUTRIA		No closed season or bag limits			
BEAVER		See *Regulations Digest*, P. 56			
CROW		Wed., Fri., Sat. of each week from June 2 through the last day of February. See *Regulations Digest*, P. 57, for additional holiday hunts. No bag limits			
STRIPED SKUNK		No closed season or bag limits			
ARMADILLO		No closed season or bag limits			

[1] See *2010–2011 North Carolina Inland Fishing, Hunting & Trapping Regulations Digest* for approximate boundaries of Eastern, Central, Northwestern and Western deer seasons. For a copy of the *Regulations Digest*, write: N.C. Wildlife Resources Commission, 1722 Mail Service Center, Raleigh, NC 27699-1722 or visit www.ncwildlife.org.

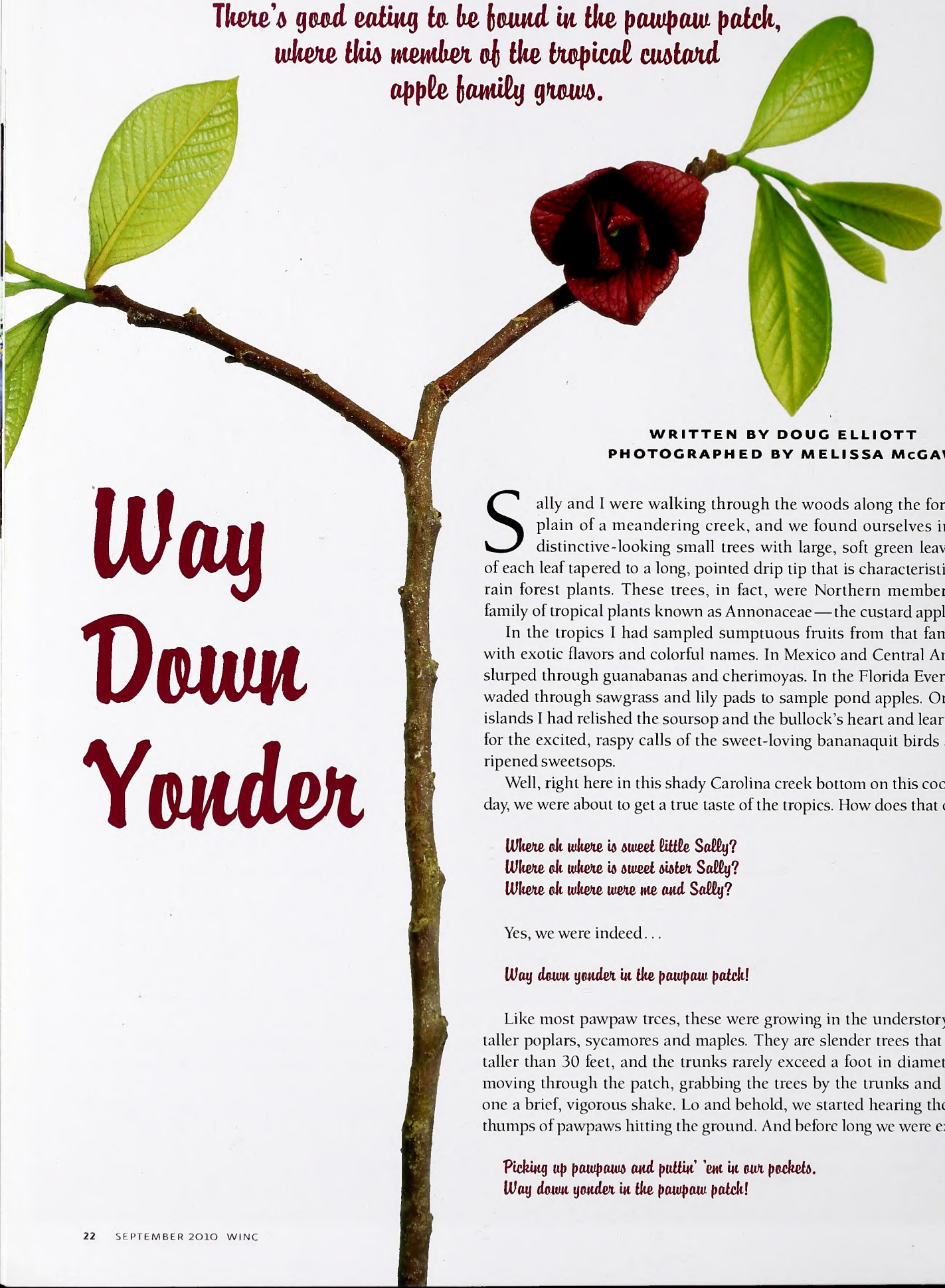
[2] See *Regulations Digest*, P. 45, for buck bag limits.

[3] In Cherokee, Clay, Graham, Jackson, Macon and Swain counties. In the other 94 counties, feral hogs are not considered to be wild boars, and the commission does not regulate them.

[4] Includes blue-winged, green-winged and cinnamon teal.

[5] The bobcat, raccoon and opossum seasons are closed in the Harmon Den and Sherwood bear sanctuaries in Haywood County.

There's good eating to be found in the pawpaw patch, where this member of the tropical custard apple family grows.



Way Down Yonder

WRITTEN BY DOUG ELLIOTT
PHOTOGRAPHED BY MELISSA McGAW

Sally and I were walking through the woods along the forested floodplain of a meandering creek, and we found ourselves in a grove of distinctive-looking small trees with large, soft green leaves. The end of each leaf tapered to a long, pointed drip tip that is characteristic of tropical rain forest plants. These trees, in fact, were Northern members of a large family of tropical plants known as Annonaceae—the custard apple family.

In the tropics I had sampled sumptuous fruits from that family—fruits with exotic flavors and colorful names. In Mexico and Central America I had slurped through guanabanas and cherimoyas. In the Florida Everglades I had waded through sawgrass and lily pads to sample pond apples. On Caribbean islands I had relished the soursop and the bullock's heart and learned to listen for the excited, raspy calls of the sweet-loving bananaquit birds announcing ripened sweetsops.

Well, right here in this shady Carolina creek bottom on this cool September day, we were about to get a true taste of the tropics. How does that old song go?

Where oh where is sweet little Sally?
Where oh where is sweet sister Sally?
Where oh where were me and Sally?

Yes, we were indeed...

Way down yonder in the pawpaw patch!

Like most pawpaw trees, these were growing in the understory, shaded by taller poplars, sycamores and maples. They are slender trees that rarely grow taller than 30 feet, and the trunks rarely exceed a foot in diameter. I started moving through the patch, grabbing the trees by the trunks and giving each one a brief, vigorous shake. Lo and behold, we started hearing the distinctive thumps of pawpaws hitting the ground. And before long we were excitedly...

Picking up pawpaws and puttin' 'em in our pockets.
Way down yonder in the pawpaw patch!

Pawpaws are found from the north shore of Lake Ontario south as far as northern Florida and west to the Great Plains. In the Carolinas and other parts of the South, we also have a dwarf pawpaw, a small shrub with tiny fruits.

As little known as pawpaws are even today, they have interesting connections to our history. George Washington enjoyed dining on chilled pawpaws, and Thomas Jefferson cultivated them at Monticello. The Lewis and Clark expedition subsisted on "a great many papaws, a fruit in great abundance on the Missouri, from the river Platte to its mouth." Daniel Boone and Mark Twain were reported to have been pawpaw fans. John James Audubon painted the yellow-billed cuckoo on a pawpaw tree. There are towns named Pawpaw in Indiana, Illinois, West Virginia and Michigan.

A Portuguese chronicler who traveled with Hernando de Soto was the first European to write of pawpaws. He reported American Indian tribes cultivating the fruit in the Mississippi Valley in 1541. For the next 150 years, little was heard of the pawpaw, until John Lawson, after traveling through the eastern half of North Carolina in 1700, reported in his 1709 "New Voyage to Carolina" that "The Papau is not a large tree [but] it bears an Apple about the bigness of a Hen's Egg, yellow, soft, and as sweet as anything can well be. They [the Indians] make rare Puddings of this Fruit." Mark Catesby described and illustrated the pawpaw in his 1743 "Natural History of Carolina, Florida and the Bahama Islands." This was the first fully illustrated study of the natural history of North America. (Catesby described the pawpaw in Latin as *Anona fructu lutescente, laevi, scrotum Arietis referente,* which translates to mean "Anona with smooth yellowing fruit resembling the scrotum of the Ram.")

Annona was the Roman goddess of agricultural produce, and her name was adopted for the plant family Annonaceae. The current botanical name for the pawpaw is *Asimina triloba. Triloba* describes the flower's three petals and sepals. *Asimina* comes from *asimin*, the American Indian name for the fruit. (A native speaker of Algonquin told me that the root of the word, *min*, refers to food, hence our name "persimmon" for another native fruit.)

DOUG ELLIOTT

Pawpaws, which usually weigh from a few ounces to half a pound, have large black seeds and flesh that reminds some of bananas.

Catesby included a full-sized painting of the pawpaw in his book; however, pawpaw aficionados have long pointed out that the painting is not quite accurate. It shows flowers on the same branch with mature leaves and ripe fruit. This never happens in nature, as the flower appears in early spring well before the leaves reach full size. Catesby's flowers are not the correct color either, being rendered greenish white rather than the actual rich brownish purple, and the fruit is unnaturally colored a deep golden yellow.

A little historical perspective, however, explains these discrepancies, and considering the circumstances, perhaps we could cut Mr. Catesby a little slack. Catesby had spent more than a decade exploring the Southeast, observing, illustrating and amassing a massive collection of plants and animals. Then he spent the next 20 years back in England working on his book, which is still acclaimed as a masterwork. Somehow he never ran across a pawpaw in his travels, so he prevailed upon Quaker botanists John Bartram and Peter Collinson for specimens. Bartram lived in Philadelphia and traveled extensively, collecting plants and sending them to Collinson in England, who then cultivated them and dispersed specimens to naturalists such as Catesby and Carolus Linnaeus.

But how could they have kept the delicate and ephemeral pawpaw flowers and the highly perishable fruit in good condition on the two-month trip across the Atlantic by sailing ship? Collinson worked out a plan and sent the following instructions to Bartram in 1736.

"There is another plant that we want seed and specimens of, that is the Papaw [on] behalf of a curious naturalist, who neglected when in Virginia, to draw the Papaw; and as this is a curious plant, in flower and fruit, and not figured by anybody . . . they tell us such stories of its fruit, that we would be glad to see it; which may be easily done, by gathering two or three bunches of its fruit, full ripe, and putting them into strong rum, in a jar or pot, and corking it up close, will keep very well . . . specimens of it in flower . . . one small twig would be enough; but thee may put several loose flowers in the jar of spirits, and

DOUG ELLIOTT

CLYDE SORENSON

DOUG ELLIOTT

The pawpaw, a native understory tree, has fruit that contains seeds the size of lima beans. Zebra swallowtails lay their eggs only on pawpaws (chrysalis, far right, and adult on liatris, immediate right).

then a couple of fruit, full ripe. . . . " How can we fault Catesby's artistry if his flowers were a little faded after two months at sea rocking in a jar of rum, and so what if he gilded the fruit a bit? I do wonder how that pawpaw-flavored rum tasted.

The pawpaw's distinctive fleshy, purplish-brownish maroon flowers have a mild, fetid, musky aroma that attracts flies and other insects that serve as pollinators. In fact, some pawpaw growers have been known to strew their pawpaw patch with roadkill to attract carrion flies and gnats, which will likely investigate anything with a meaty appearance and a rank odor.

The fruits are somewhat kidney-shaped, resembling soft, stubby cucumbers, and usually weigh between a few ounces and a half pound. But they can be larger. Pawpaws are actually our largest native North American fruit. Neal Peterson, who is the founder of the Pawpaw Foundation and known to many as Mr. Pawpaw, told me that the largest pawpaw he ever grew weighed 1 pound 15 ounces. He said it was large enough to feed a family.

Inside the thin green skin, pawpaw fruit resembles a creamy banana with plump black seeds the size of large lima beans. The fruit is very nutritious — high in protein, vitamins, minerals and sugars.

Describing the taste has long been a challenge for outdoor writers and pawpaw lovers alike. Peterson says the taste is "a symphony of flavors in your mouth . . . like the finest custard you ever ate." After downing a good pawpaw, he says, "the world is definitely a nicer place to be in."

Janet Lembke, the author of "Shake Them 'Simmons Down," an excellent book celebrating Southern trees, laments the difficulty in describing the flavor of a fruit that tastes like itself. Then she offers: "creamy smoothness of banana, enlivened by a light but definite hint of pineapple, a dollop of clover honey, and a dash of vanilla."

Euell Gibbons, the dean of American foragers, handed off the task to an Indiana country boy, who said the fruits taste like "mixed bananers and pears, and feel like sweet 'taters in your mouth." Jim Hillibush, a wry Ohio journalist, wrote, "It's an acquired taste. I'm still acquiring it . . . my pawpaw loving friend says it tastes like an 'overripe banana with hints of mango, pineapple, melon and berries.' If [it were] still green, I'd add rancid sneakers . . . because you must know when a pawpaw is ripe. Unripe ones taste like, I don't know, week-old socks?" I wonder, *Do many Ohio journalists taste their old socks?*

Derek Morris, a Forsyth County agricultural extension agent, has more than 30 different varieties of pawpaw trees growing on less than an acre. He says the flavor varies with the different varieties and with the stage of ripeness. His favorite variety, so far, is the Overleese. He describes it as "caramel and butterscotch — rich, sweet and with the texture of a baked sweet potato. It improves with age," he says, "even when the fruit turns black."

Turning black is one of the obstacles pawpaws face on the road to wider acceptance and marketability. The reason you rarely see them in the market is because of their short shelf life, which is usually somewhere between six hours and three days. (Refrigeration can extend this somewhat.) Breeders are working to develop varieties with a longer shelf life, smaller seeds, and less bitterness and astringency than are found in many of the wild fruits.

In the last 20 years, there has been a great deal of interest in developing the pawpaw as a commercial crop. The center for research into pawpaw production is Kentucky State University, which has had a comprehensive program since 1990. Ohio has crowned the pawpaw as its official state fruit. Ohio has its own pawpaw growers' association and has held an annual pawpaw festival since 2000.

North Carolina has a number of growers as well, and occasionally North Carolina farmers markets feature pawpaws during the short time they are in season. The Dixie Classic Fairgrounds Farmers Market in Winston-Salem has its annual Pawpaw Day on Sept. 4 from 9–11 a.m. Leslie Sanderson has more than 50 trees producing near Maxton, and he sells many pounds at markets in the Robeson County area. Milton

"Pawpaw" Parker has a number of trees under cultivation near Whiteville, and he is involved in the formation of the Appalachian Pawpaw Growers Association. Parker can often be seen at the Columbus County Farmers Market selling fresh pawpaws in August, when they are in season, and pawpaw milkshakes off season. He says that freezing the pulp is a great way to store pawpaws. Pawpaw pulp really lends itself to smoothies, milkshakes and ice cream. Morris says, "Even people who don't like pawpaws like pawpaw ice cream."

The pawpaw plant contains a plethora of potentially useful chemical compounds in the leaves, stems and seeds. In the old days pawpaw seeds were powdered and used as a treatment for head lice, and more recently some of the compounds are being developed into insecticides. There is a family of compounds found in the leaves and stems known as annonaceous acetogenins that are being used to treat cancer.

The pawpaw has a very fibrous inner bark that has been used since ancient times to make nets, rope, twine and other cordage. In fact, that reminds me. Remember that gal, Sally, I was telling you about at the beginning of this article? Her name wasn't really Sally, but many years ago when she and I were in that pawpaw patch, we came upon a pawpaw tree that had just been knocked over by a large fallen branch. I stripped the bark off that fallen tree and extracted a long strand of the smooth, fibrous inner bark. She snatched that bark right out of my hands and amazed me as she crocheted those natural fibers into a beautiful, round, doilylike thing. That crocheted piece is now hanging on a wall in our house, which overlooks a pawpaw patch on the banks of Chalk Creek in Rutherford County. It's been hanging there for more than 20 years. And that gal? She's still hanging around, too — and she still amazes me.

DOUG ELLIOTT

Doug Elliott is a naturalist, storyteller and author of a number of books and recordings of stories, songs and lore celebrating the natural world. For more information, visit dougelliott.com.

Pawpaw Recipes

Pawpaws are best the day they reach perfect ripeness, when they are soft to the touch. It is best to peel away the skin and eat them fresh out of hand. Be sure to spit out the seeds. I learned from a Cuban friend to put the pawpaw pulp in a blender with milk, water and honey and make a delicious smoothie drink he called *un vatido*.

The pulp can be used in place of bananas in any banana bread recipe, but when it comes to celebrating the taste of pawpaws, dishes with less cooking are better because heat destroys many of the flavors.

Pawpaw Pie or Parfait

Euell Gibbons, in his 1962 classic wild foods book "Stalking the Wild Asparagus," shared this recipe for parfait or pie filling:

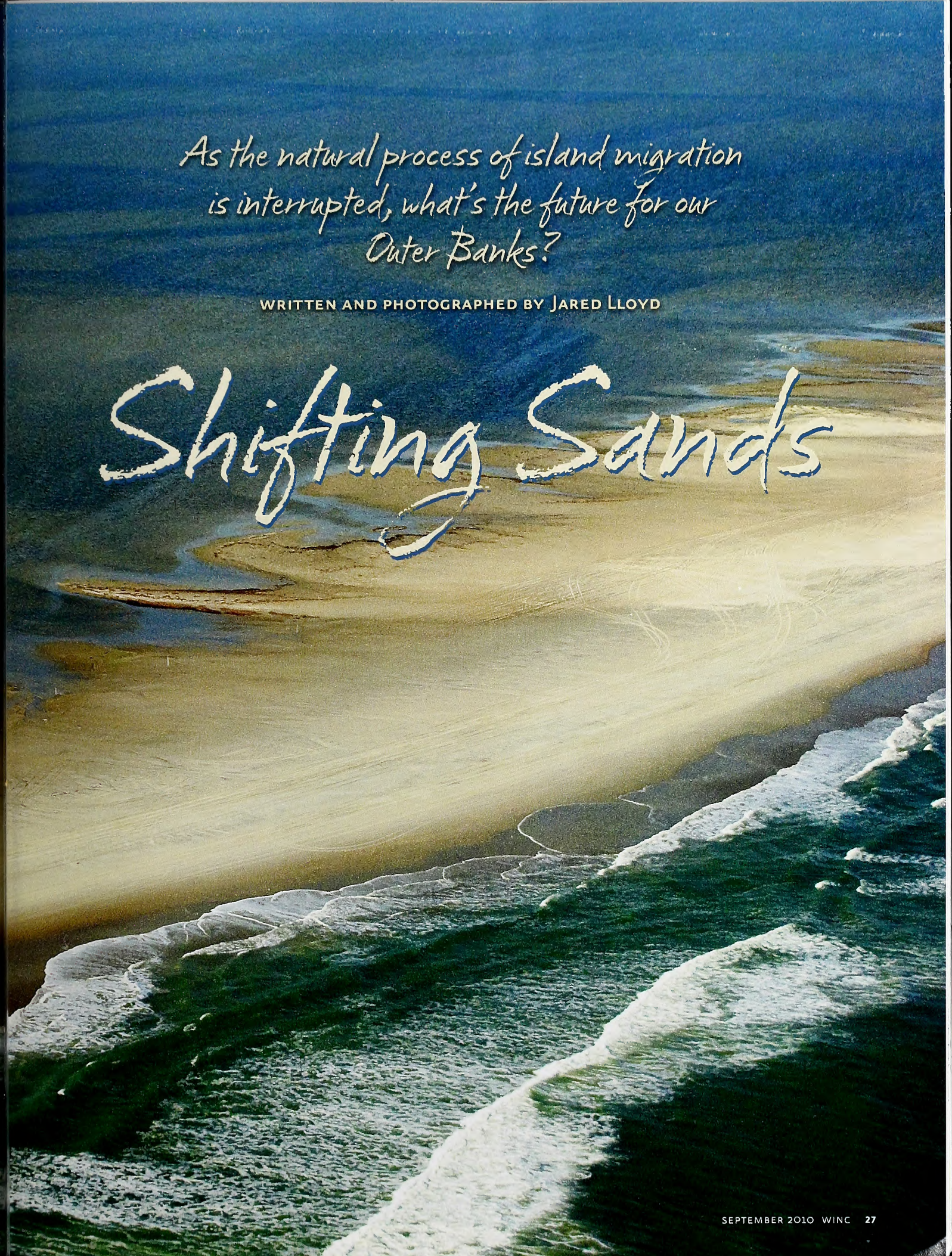
In a saucepan mix together 1/2 cup brown sugar, 1 envelope unflavored gelatin and 1/2 teaspoon salt. Stir into this 2/3 cup milk and 3 slightly beaten egg yolks. Cook and stir the mixture until it comes to a boil. Remove from heat and stir in 1 cup of strained pawpaw pulp. Chill for about 20 or 30 minutes in the refrigerator, until it mounds slightly when spooned. Shortly before the mixture is sufficiently set, beat 3 egg whites until they form soft peaks, then gradually add 1/4 cup sugar, beating until stiff peaks form. Fold the partially set pawpaw mixture into the egg whites. Pour into a 9-inch graham cracker crust or into parfait glasses and chill until firm.

"Then," Gibbons recommends, "lock the doors to keep the neighbors out!"

Pawpaw Zabaglione

Pawpaw zabaglione was created by Chef Michael Luska of the Yellow Brick Bank Restaurant in Shepherdstown, W.Va., for the banquet at the first Pawpaw Foundation conference.

Combine 6 egg yolks and 1/2 cup sugar in the top portion of a simmering double boiler, Warm 1 cup passion fruit liqueur and add it to the egg-yolk-and-sugar mixture and cook, stirring constantly, until thickened. Allow mixture to cool, then fold in 1 cup pawpaw pulp. Whip 1 cup whipping cream and fold it into mixture. Serve chilled.



As the natural process of island migration is interrupted, what's the future for our Outer Banks?

WRITTEN AND PHOTOGRAPHED BY JARED LLOYD

Shifting Sands

In 1585, when Sir Richard Grenville first set foot upon the barrier islands of North Carolina, he walked into a world wholly different from the lavish resort communities that we now know as the Outer Banks. Aside from lacking the glitz and trappings of a vacation destination, the barrier islands in the days of English exploration were far more numerous and restless than the seemingly subdued versions we sunburn on today. The age-old axiom "change is the only constant" is not simply a cliché on these ribbons of sand; it is a law of physics.

With each passing storm, the emerald green waves of the Atlantic that rush upon our beaches turn back another page of history that the sands have hidden beneath their all-encompassing embrace. The beaches of our islands are littered with the results: tree stumps protruding from the edge of the surf, clay, pebbles, rocks, coquina boulders, shelves of ink-black peat moss, chunks of coal. Even the shells have their story to tell, if only we would listen.

Each of these enigmatic relics harkens back to a time long ago. Some, such as the tree trunks and peat moss, reveal the past back to the days when European colonists were lost on our islands. Others, however, can be understood only in the context of tens of thousands of years. Yet all of these artifacts coalesce into one story: that of islands migrating.

With wind and water as dance partners, the sand is always shifting. Anyone who has ever taken a stroll down the beach during a stout northeast wind can attest to this. Those who bore witness to Hurricane Isabel's storm surge on Hatteras Island or the Ash Wednesday Storm of 1962 know all too well the precarious nature of sand and the harsh realities of life on a sandbar. Be they hurricanes, nor'easters or just the general northeast patterns of winds that blow in off the ocean for much of the year, all of these processes are continuously

working together to transfer sand from the beach to the back of the islands. This is barrier island migration in the simplest of explanations.

For barrier islands to migrate, four things must occur: the ocean side of the island must move landward, the back of the island must grow wider, the island must continually be built up in elevation with sand and the shoreline of the mainland must keep pace with the island's migration.

Though the steady onslaught of winds that attack our shoreline throughout much of the fall, winter and spring helps to drive this process, overwash brought on by hurricanes and large nor'easters is the real engineer of migration. As a storm surge pushes across the islands, sand is transferred with the waves and deposited either near the center of the island or completely over it and out into the sound on the other side. The storm surge that crossed Hatteras during Isabel deposited so much sand in Hatteras Village that the overall elevation of the town was raised by about 2 meters. The vast stretches of great dunes that once covered much of the Outer Banks prior to recent decades were a product of this constant building up. This process of overwash is what satisfies the first three tenets of barrier island migration.

All things considered, it is ultimately rising sea levels that initially force islands to migrate — otherwise, the islands would drown. As sea levels rise, high tides become higher and storm surges farther reaching. Therefore, the faster the rate of rise, the faster the island turns over. As for the mainland shoreline keeping pace with this migration, that is simply a matter of rise overrun. On the North Carolina Coastal Plain, that is roughly a 1:2,000-foot ratio, meaning that for every foot gained in sea level, the mainland shoreline will lose roughly 2,000 feet. In other words, if current predictions of a 3-foot rise in sea level over the next century are correct, then everything within a mile of our sounds today will be underwater in 90 years.

The oddities that sometimes are revealed upon our beaches are a testament to change. Obviously forests do not grow out of the ocean or the beaches. The stumps that can be found in areas such as Swan Beach, South Nags Head and Pea Island were all once part of a maritime forest growing along the sound side of the islands. As the islands continued to migrate, these forests were buried beneath the sand.

North Carolina's barrier islands must constantly rebuild themselves in order to survive. Wind and overwash are critical elements in allowing the westward migration of these islands. Should the process be halted, the islands will be claimed by the sea.

Many people refer to these trees and stumps as part of a petrified forest. Hardened by time they may be, but there is nothing petrified about this wood. The preservation that is at work here is much less complex. To begin with, the stumps we find on our beaches are typically red cedar and live oak — two of the predominant tree species in our maritime forests today. Both of these trees produce wood that was highly prized for shipbuilding due to its strong resistance to decay. Second, as the sand filled in the forest, the trees were buried in a low-oxygen environment. Without oxygen, there can be none of the aerobic bacteria that are needed to break down dead plant matter. Last, this is a maritime environment, one where there is no shortage of salt to preserve things.

Based upon radiocarbon dating of stumps and peat moss, these organic windows into the past are probably in the neighborhood of 200 to 500 years old. This means that between two and five centuries ago, what is

now the beachfront was actually the backside of the islands, and the beach itself was up to a mile farther out to sea. Over that period of time, the islands more or less rolled over the top of themselves, and the wave energy is now exposing these once-buried forests along the shore.

During the height of the last Ice Age some 20,000 years ago, when much of the Earth's water was locked up in glaciers and continental ice sheets, the coastline of North Carolina was some 40 miles east of where our islands now sit. As the Pleistocene era began to fade away and the Earth began its transition into the Holocene, sea levels rose; river valleys were flooded out, creating the sounds; barrier islands were created, and almost immediately they were launched into their steady march to where they sit now.

As these islands migrated west, the riverbeds that carried the glacial waters and sediment from the Appalachian Mountains and Piedmont region were covered up. Sonar imaging of the sounds and ocean reveals these beds to us today, right up to the edge of the continental shelf. Remnants of these old rivers litter some of our beaches. The pea gravel that makes up so much of the beach in places such as Kill Devil Hills, Nags Head and Topsail Island is actually the sediment of these riverbeds that lie below the islands.

Every morning visitors scamper along the edge of the sea, where land meets water and two worlds collide, in search of seashells. As most avid "shellers" can attest, the oyster shell is one of the most common of these calcium carbonate exoskeletons that can be found on our beaches. The problem, however, is that oysters don't live in the ocean. They are in fact an estuarine species, meaning they live in the sounds along the backside of the islands. But if they don't live in the ocean, how did they come to make up the majority of the beach shells? As the islands migrated in a westerly fashion through the estuaries behind them, great oyster beds were buried. Now, so many years later, they are being unearthed by wave action and tossed back up onto our beaches.

NATURE'S WAYS

How Do Barrier Islands Migrate?

See Nature's Ways, page 39.

Like the peat moss and tree stumps, these oyster shells have been radiocarbon dated. Based upon such studies, researchers have determined that the majority of oyster shells found on the barrier islands are around 7,000 to 9,000 years old. If you think that's old, consider that shells found on Hatteras Island and Shackleford Banks have been dated to 40,000 years, and that the giant oyster shells found on North Topsail Beach and randomly on other islands are actually a species that went extinct around 23 million years ago!

Oysters are not alone in this regard. Most of the shells found on the beaches of our barrier islands are not marine species but instead, like the oyster, live only in estuaries. Therefore most of these shells are several thousand years old as well. So next time you're walking along the beach looking for shells, think of yourself not as shelling but as fossil hunting.

The impact of barrier island migration is not limited to those peculiarities that dot our beaches, however. The extensive network of marshes and the shallow nature of the sounds, which allows light to penetrate their depths and milfoil and wigeon grass to flourish, were created by the same processes that

drive migration. From overwash fans to the natural succession of inlets being opened and closed, the constant movement of sand allows for the back-island shoaling that fosters our famous waterfowl habitat.

Following the end of the Civil War, Union soldiers who had fought in eastern North Carolina began flooding back into the area for its natural wonders. Folks from all over the Northeast came, much as they do now, to our islands. At the time, it was not the euphoric warmth of the summer sun they were after. It was the cold. It was the frigid wind, sleet, snow, freezing rain and what every big cold front brings with it: waterfowl. The framework of modern history and tourism on many of our islands was built upon waterfowl hunting, and the movement of sand that made this sport what it is today in eastern Carolina.

For life not only to survive but to thrive on these ever-changing, precarious ribbons of sand is a testament to the adaptability of life itself. Howling winds of hurricane force, storm surges that momentarily connect sea with sound, the constant saturation of salt and the ever-present notion of a world migrating right over you: These are "life on a sandbar"—although the bumpersticker neglects to include this bit in the fine print.

All this is changing, however. The marshlands that bring in hundreds of thousands of waterfowl each year are no longer being created. Those that remain must be intensely managed to keep the ecosystem in its most beneficial stage of succession. The islands, instead of moving with the rising sea, are drowning. Overwash no longer makes its way across these magnificent sandbars. Sand dunes built in the 1930s along our beaches stop all but the largest of storms. When new sand is deposited inland, it is mined and taken back out to the beaches to re-form dunes, thereby speeding the rate of beach erosion. Much of the sound side has bulkheads, and the ocean side presents a wall of homes. Inlets that are opened by storms such as Hurricane Isabel are promptly closed by people. The islands have been beaten into submission.

Yet the ocean continues to rise. Unceasingly, unwaveringly, the dominion of Poseidon is spreading, his kingdom growing. We might be able to hold back the sand, but we cannot hold back the rising ocean. And for this reason, the barrier islands of North Carolina are experiencing a great moment of change. Those such as Core Banks and Masonboro will thrive, because humans have not imposed their architectural will upon these shores. Others, including the Outer Banks and the rest of the developed islands, eventually will be engulfed by the emerald waters of the Atlantic. Without migration, the islands cannot adapt to the rising sea.

Yet, as noted above, when it comes to these islands, change really is the only constant. The sands have been drowned before. The islands have broken apart and re-formed into long ribbons numerous times. As the narrow stretches break in two and new inlets are created where once there was a highway, the natural fluctuations of tides will bring in the sand and shoals will once again form where humans would not allow.

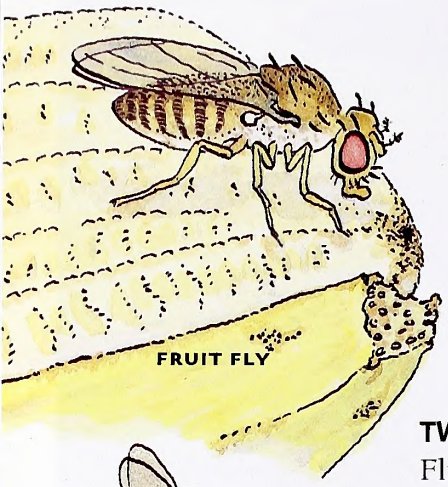
These shoals will continue to build until new islands are formed. The longshore current will continue to force the inlets to migrate in a southerly direction, and the mosaic of shoals will join together with the Outer Banks, making them wider, stronger and more resilient than before. One day hundreds of years from now, the artifacts of our civilization will wash ashore on these beaches, and someone will ponder their origins and the nature of island migration. ◆

Jared Lloyd, a naturalist and photographer living in Kitty Hawk, was the Grand Prize winner in the Wildlife in North Carolina *2008 Photo Competition.*

Stumps that appear in the surf of many North Carolina beaches are evidence that the sound side of the islands does indeed at some point become the beach side. Wave energy exposes the buried remnants of maritime forests.

One of our most important insect groups is also among our least appreciated. Let's meet a

Horde of the Flies

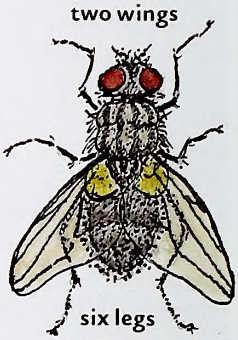

FRUIT FLY

written by Jeff Beane / illustrations and nature activity by Anne M. Runyon

Time flies like an arrow.
Fruit flies like a banana.

MOSQUITO

Both male and female mosquitoes sip nectar and plant juices, but females of most species need the added nutrients of a blood meal in order to produce viable eggs.



TWO WINGS, NO STINGS

Flies form the order Diptera (meaning "two-winged") within the class Insecta. They have only two wings; most insects have four or none. The few others that have two usually don't resemble flies. A fly's hind wings have evolved into a pair of small, knobbed structures called halteres, which help maintain balance during flight. Some flies have small flaps called calypters at the base of each wing. If in doubt, count wings—if only two, it's probably a fly.

Like all insects, flies have exoskeletons made of protein and chitin, six legs and three body parts (head, thorax and abdomen). Their antennae vary, but most are short and inconspicuous with as few as three segments. Most flies have short, streamlined bodies, quick reflexes and large compound eyes that may join on top of their heads. Females of a few species are wingless. Flies don't sting, but some bite.

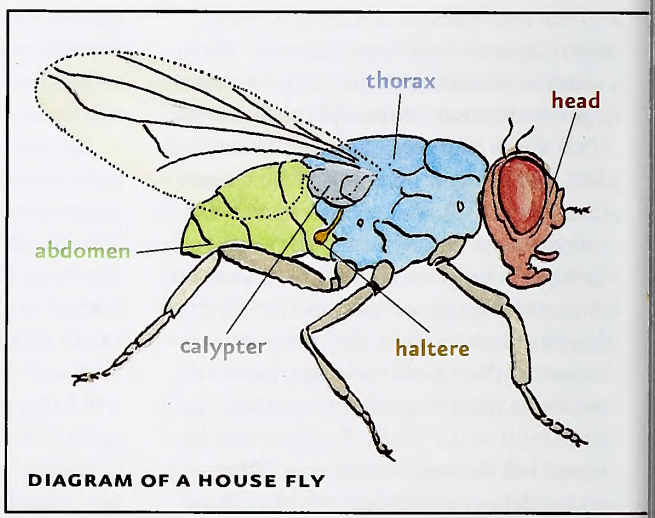
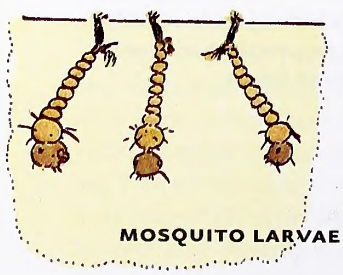


DIAGRAM OF A HOUSE FLY

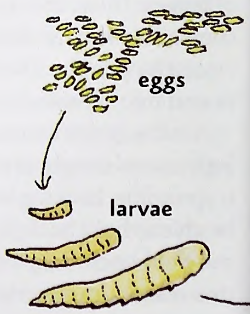
FLY BIO

Flies undergo what entomologists call complete metamorphosis—they have an egg, larval, pupal and adult stage. Fly larvae are known as maggots. Maggots may live in soil, muck, dung, carrion or living plant or animal tissue. Many fly larvae are aquatic.

Most adult flies live only a few days or weeks, which they spend feeding, mating and dodging predators. A few species may live for several months. Flies have sucking mouthparts and can ingest only liquids. Some spit saliva onto solid food to dissolve it. Others have piercing mouthparts for preying on smaller insects or sucking blood from larger animals. Some species feed only as larvae.


MOSQUITO LARVAE

LIFE CYCLE OF A HOUSE FLY

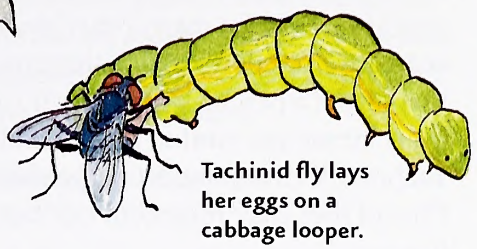


Bat pursues a crane fly.

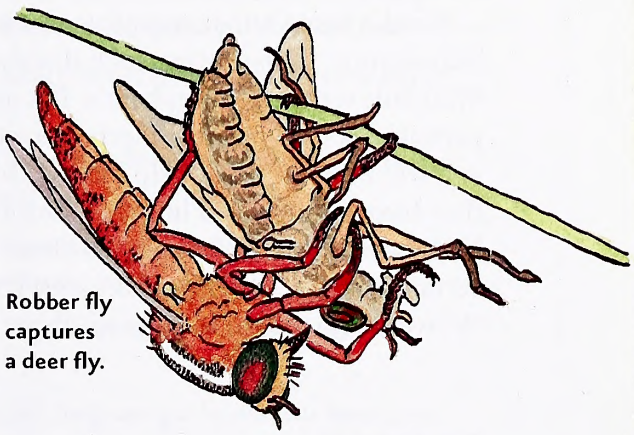
FLY DIVERSITY

About 180 families, well over 2,000 genera and over 150,000 species of flies are known. Some entomologists believe at least that many more remain to be described. North America boasts more than 16,000 species.

The house fly, *Musca domestica*, is perhaps the most familiar fly, and many species share its general body form. But others are slender and elongated (robber flies, stiletto flies), stocky and humpbacked (black flies, small-headed flies) or flattened (louse flies, seaweed flies). Most species are fairly small, like gnats, punkies and fruit flies, but some of the larger horse flies, mydas flies and robber flies may exceed an inch in body length. The extended legs may span several inches in some crane flies—these large, gangly, completely harmless flies are often mistaken for giant mosquitoes. Real mosquitoes (Spanish for "little fly") are small, slender, notorious flies with feathery antennae and long, piercing mouthparts. Nearly 70 species occur in North Carolina, of which perhaps two-thirds bite humans (some specialize on birds or reptiles). Midges are a large group of very common flies, sometimes forming huge swarms. They're often mistaken for mosquitoes, but don't bite. Some hover flies, robber flies, bee flies and soldier flies mimic bees or wasps and are often mistaken for them. Big-headed flies have huge heads consisting almost entirely of their enormous compound eyes.



Tachinid fly lays her eggs on a cabbage looper.



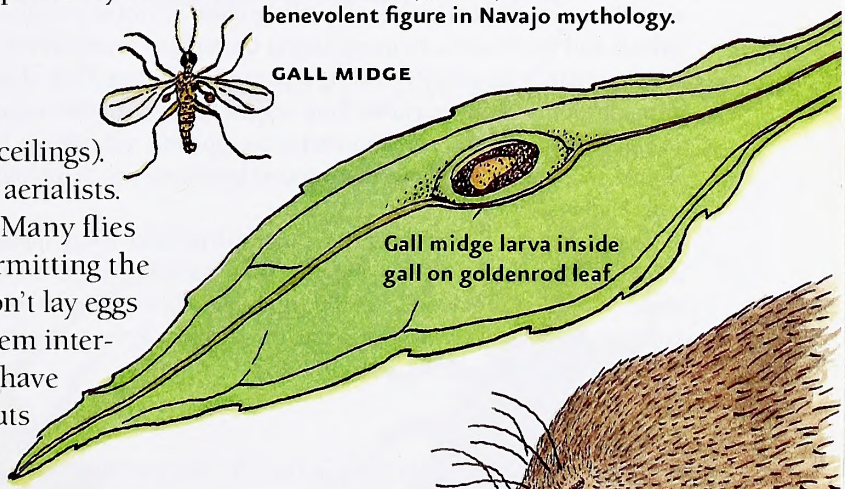
Robber fly captures a deer fly.

Flies feature prominently in human history, culture, literature and folklore. Usually they're portrayed negatively, although Big Fly—probably based on the tachinid, *Hystricia pollinosa*—was a benevolent figure in Navajo mythology.

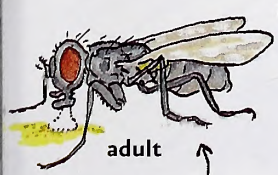
SUPERFLIES

Flies can do some remarkable things (besides walking on ceilings). Hover flies and bee flies surpass hummingbirds as superb aerialists. Some tabanid flies may attain speeds of up to 90 mph. Many flies have diverticula, or side pockets, in their stomachs, permitting the ingestion of enormous liquid meals. Parasitic louse flies don't lay eggs but retain their larvae inside their bodies, nourishing them internally until they're born alive and ready to pupate. They have among the lowest reproductive outputs of all insects and longer life spans than most flies.

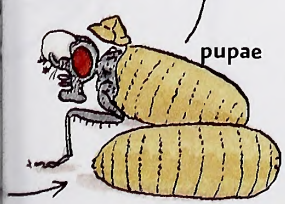
GALL MIDGE



Gall midge larva inside gall on goldenrod leaf.

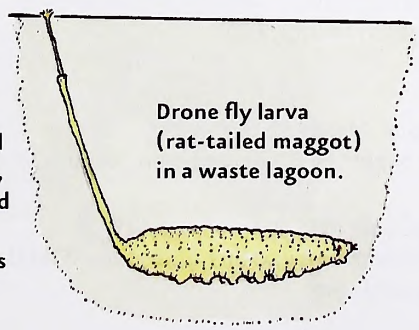


adult



pupae

Most maggots are legless and wormlike, with eyes and antennae reduced or absent, and often a poorly developed head—all adaptations to the nutritious environments in which they develop.



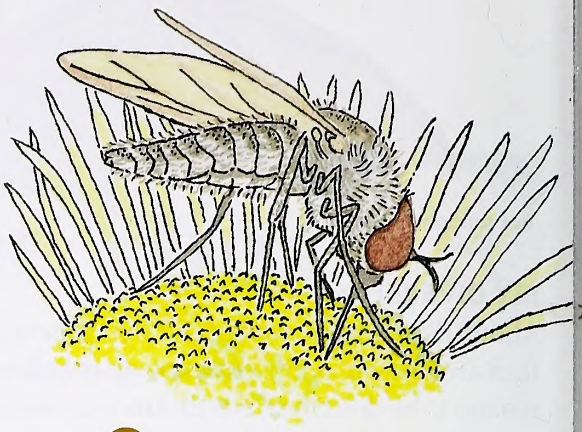
Drone fly larva (rat-tailed maggot) in a waste lagoon.

Star-nosed mole gobbles a crane fly larva.

MOSTLY GOOD GUYS

Flies play crucial roles in most terrestrial and aquatic ecosystems, providing food for many other creatures. Who hasn't seen spiders snare flies, swallows snatch them on the wing or flycatchers "hawk" them from a perch? Despite their unpopularity, mosquitoes and their larvae are vital to marsh and other wetland ecosystems. Tachinid flies are important predators of many agricultural pests. Phorid flies may represent our best hope of controlling invasive fire ants.

Besides being minor annoyances, some flies are of major medical importance, transmitting such diseases as malaria, yellow fever, West Nile virus and encephalitis. But most are important predators, parasites, pollinators, scavengers, decomposers, sanitation engineers and soil builders. Flies help forensic scientists solve crimes. Fruit flies have contributed hugely to our understanding of genetics. Maggots are used as fish bait, to clean wounds, and even to make certain cheeses. Birds and bats aren't our only two-winged allies. We would do well to learn more about flies.



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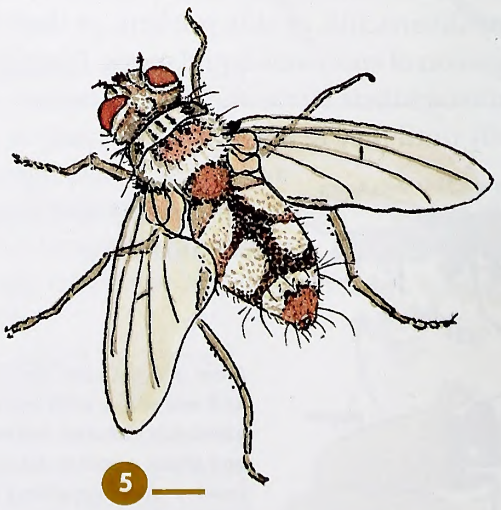

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Get Outside

Fly hunting is easy: You may have fruit flies stalking your bananas or moth flies breeding in your drains. If not, step outside on a warm, humid day. Certain flies will come right to you. Deer flies, stable flies, mosquitoes and no-see-ums are out for blood; nonbiting but perhaps equally annoying species like eye gnats crave sweat or tears. But you'll have to hunt for most species. Protein-rich or sugary substances like fruit, sweet liquids or meat will attract some species. Keep habitat and food source in mind as you investigate roadkills for blow flies or search wetlands for ghostly-looking phantom crane flies. Flies often visit flowers or mushrooms. Shiny-metallic long-legged flies patrol the surfaces of leaves. The pustules or "warbles" often visible on squirrels indicate bot fly infestation. Should you work around pigeons or other live birds, watch for louse flies among their feathers.

Sweeping vegetation with an insect net will produce many species. Many flies will visit lights at night. Some are difficult to identify; others are easier to learn. Many can be keyed at least to family with a good field guide, or try sending specimens or photos to your local museum, university or agricultural extension office. The BugGuide.net website is helpful.

Read and Find Out

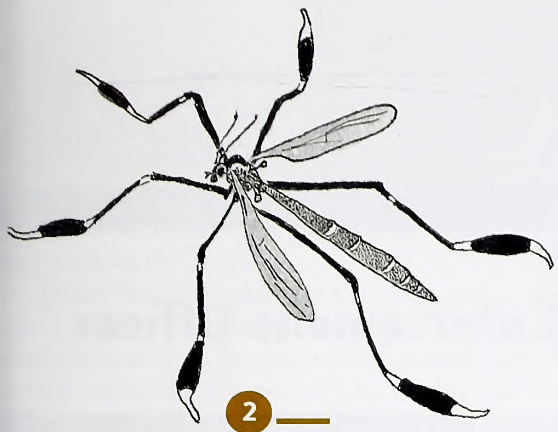
- "The Natural History of Flies" by Harold Oldroyd, W.W. Norton, 1965.
- "A Field Guide to the Insects of America North of Mexico" by Donald J. Borror and Richard E. White, Houghton Mifflin, 1970.

In *Wildlife in North Carolina:*

- "March of the Love Bugs" by Jeff Beane, March 2003.
- "Little Things That Go BUZZ in the Night" by Clyde Sorenson, August 2005.

- On the World Wide Web: www.BugGuide.net
  Find out more about Project WILD Workshops and literature at the Wildlife Commission's Web site at www.ncwildlife.org.

A Diptera Match Game



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True flies are insects of the scientific order Diptera, a word that means "two wings." Common names of true flies are usually spelled as two words (house fly, bot fly, horse fly) to distinguish them from other flying insects (dragonfly, sawfly, mayfly) belonging to different orders.

Match the true fly illustrations to the clues listed below.

A. *Geron* is a bee fly, a beneficial insect that pollinates plants. Has a long proboscis (needle-like mouthparts) like a mosquito but does not bite.

B. *Tritoxa* is a picture-winged fly, which comes in various colors and has a distinctive wing pattern.

C. *Zelia* is a tachinid fly. It has an interestingly patterned body and its young are parasites of other insects' larvae.

D. *Lucilia* is a blow fly with an iridescent metallic body and a fondness for carrion — the remains of dead animals.

E. *Clogmia* is a moth fly, a fuzzy-hairy insect often found in damp areas, including bathrooms.

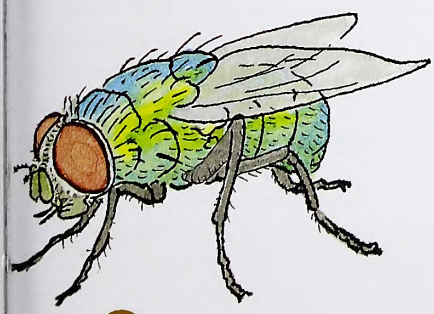
F. *Bibio* is a March fly, a small-headed, long-winged insect that feeds on a variety of vegetation.

G. *Eristalis* is a flower fly. It mimics honey bees so well, it is sometimes called a drone fly.

H. *Bittacomorpha* is a phantom crane fly, which flies slowly with its long legs extended and seems to disappear in the shade.

4 ___

Answer key 1. A 2. H 3. B 4. G 5. C 6. D 7. E 8. F



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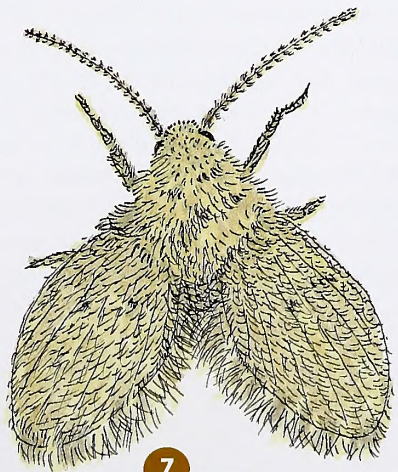

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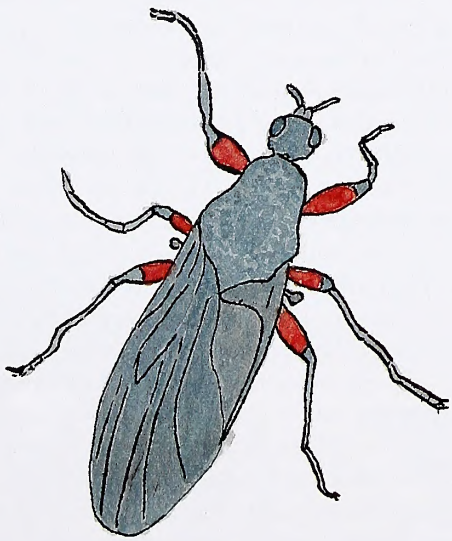

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Caveny Succeeds Everhart as Top Enforcement Officer

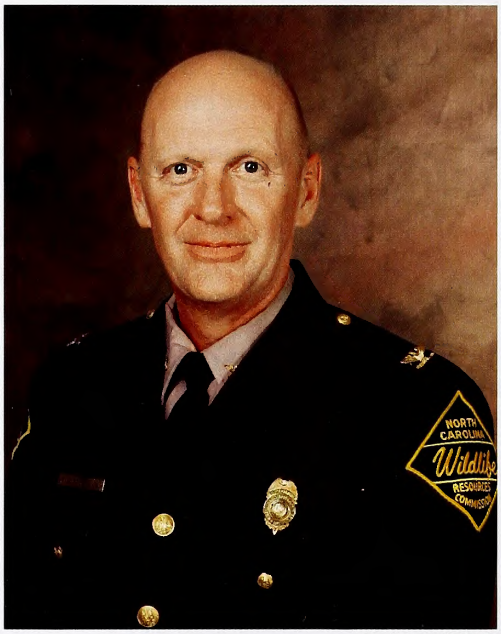
Dale Caveny, a 25-year veteran, has been promoted to lead the N.C. Wildlife Resources Commission's Division of Law Enforcement. He will direct 200 officers who enforce hunting, fishing and wildlife conservation laws as well as boating regulations; offer hunter and boater safety courses; and investigate hunting and boating accidents.

"I consider wildlife officers to be some of the most professional and dedicated of all law enforcement officers," said Caveny. "It is a great honor to continue serving in this new role with those men and women. The strength of the division is sound, the resolve of its officers is unwavering and we will continue to diligently manage and protect the resources and ensure public safety."

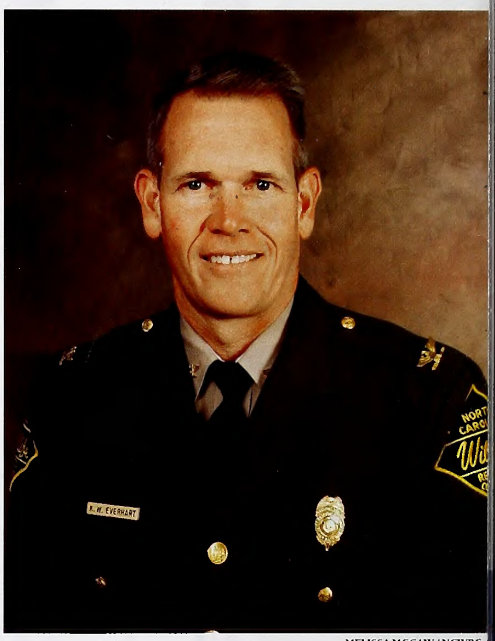
A native of Kings Mountain, Caveny graduated from Kings Mountain High School and received an associate degree in Criminal Justice from Isothermal Community College and a bachelor's degree in Criminal Justice from Western Carolina University.

"The work of wildlife enforcement officers is critical not only for conserving the abundance and diversity of North Carolina's wildlife resources, but also for public safety, opportunity and access, and education," said Gordon Myers, executive director of the Wildlife Commission. "Col. Caveny will focus on leading the Division of Law Enforcement in implementing the agency's strategic plan while continuing the traditions of excellence and integrity that are hallmarks of our wildlife law enforcement programs."

The post was held previously by Kenneth Everhart, who retired after a 28-year career with the Wildlife Commission. Everhart had served as colonel since July 2004. An Eagle Scout who grew up in Rowan County—where his parents Howard and Diane Everhart still live—Everhart recalls a scout camporee where a wildlife officer spoke to the young men attending.



MELISSA MCGAW / NCWRC


MELISSA MCGAW / NCWRC

Dale Caveny (left) assumed leadership of the commission's Division of Law Enforcement upon the retirement of 28-year veteran Ken Everhart.

"I came home from that weekend and told my parents I knew what I wanted to do," he said.

Everhart worked up through the ranks. He was first stationed in Granville County in 1982. He also worked in Union County, as a sergeant for Catawba, Lincoln and Gaston counties and as a lieutenant based in Wake County. In 1993, he earned a promotion to captain in charge of officer recruit training.

He was promoted to major in charge of wildlife enforcement's administrative operations in 1996. A year later, he became major in charge of field operations, a post he held until promoted to head of the Division of Law Enforcement upon the retirement of Col. Roger LeQuire in 2004.

"One of the first things I plan to do [in retirement] is buy some clothes, since I've been wearing a tan and green uniform for so long," Everhart said. "Then I expect to do something for a group like Habitat for Humanity, catch up on my hunting and fishing, and generally enjoy time with my family."

He and his wife, Marilyn, have three children, Abby, Kyle and Hunter.

e NEWSLETTER
Get N.C. Wildlife Update—news including season dates, bag limits, legislative updates and more—delivered to your Inbox from the N.C. Wildlife Resources Commission. Sign up at www.ncwildlife.org/enews.

Marine Fisheries Stock Status Stable

The N.C. Division of Marine Fisheries' 2010 Stock Status report shows that saltwater fish populations in North Carolina are stable and, in many cases, showing improvement. "We're continuing to see some positive trends as reflected in the recovery and continued viability of several species," said Louis Daniel, director of the division.

MIKE MARSH

Summer flounder remains listed as recovering, and striped bass in the ocean and in the Albemarle Sound-Roanoke River Management Area remain listed as viable. Spiny dogfish moved from "recovering" to "viable" based on a 2010 stock assessment that found that the stock has been rebuilt.

Additionally, bay scallops continue to recover, allowing for periodic season openings in some water bodies. Oysters, while remaining listed as "concern," have shown signs of improvement with increased landings and increased spat fall in both wild harvest areas and in sanctuaries.

Spotted seatrout, moved from "concern" to "depleted" based on a 2009 stock assessment. The assessment indicated the stock is overfished and undergoing overfishing based on data from 1991–2008.

"We don't like to see any stocks downgraded, but we've already implemented a higher size limit for spotted seatrout, and a rebuilding plan should be completed prior to the next harvest season," Daniel said.

The annual stock status report serves as a general barometer of the overall health of North Carolina's coastal fishery resources, and it is used to prioritize development of fishery management plans and subsequent plan amendments. The 2010 Stock Status Report can be found online at www.ncfisheries.net/stocks/index.html.

Marine Fisheries also has a new web page where anglers can log their saltwater catches to help state fisheries managers with their recreational fishing surveys. It can be accessed at www.ncfisheries.net under Hot Topics.

This online tool provides an alternative way for anglers to report their catches when they are contacted for surveys by the division's Coastal Angling Program, which gathers recreational fishing statistics for the agency.

For years, the division has contacted recreational anglers through telephone interviews and mail surveys to obtain information for recreational catch statistics. These statistics help authorities determine what size and bag limits or seasons are needed to ensure sustainable fish populations.

The website also provides a section called the Coastal Angling Journal, where any fisherman, not just those contacted for surveys, can voluntarily record catches. Questions include information about the date and time of the fishing trip, the weather, where the fish was caught, and the species targeted and caught. The Coastal Angling Journal will allow fishermen to keep online records of their individual fishing activity and print reports of that activity. The division will be able to compare the information it receives from those voluntarily recording their trips with the data it gathers through its surveys.

This electronic reporting system was funded, in part, by revenues from the Coastal Recreational Fishing License.

Commission Crafts New Pier from Closed Bridge

The N.C. Wildlife Resources Commission, in cooperation with Chowan County and the N.C. Division of Marine Fisheries, has opened the Chowan River Bridge Access Area, which consists of a renovated Wildlife Commission boat ramp and a fishing pier created from the old Chowan River Bridge.

This collaborative project was partially funded from sales of the Coastal Recreational Fishing License, motor boat registration fees and the Federal Aid in Sport Fish Restoration Program. This fishing pier is the first angler access project funded by receipts from the Coastal Recreational Fishing License.

The site, off N.C. 17 in Chowan County, features fixed and floating docks, a new concrete apron, new ramps, bulkhead and an improved, paved parking lot. The old highway bridge, which was closed in 1999, has been repurposed as a fishing pier, with a restroom building and vending area.

"The accessible fishing area and renovated boating access area at the Chowan River Bridge provide boaters and anglers with quality access to a very popular waterway," said Erik Christofferson, chief of the Division of Engineering Services. "We are thrilled with this partnership with the N.C. Division of Marine Fisheries that allows us to receive this from the Coastal Recreational Fishing License funding. Ultimately, the citizens of North Carolina benefit with improved access to our public waters."

The commission also has performed a major upgrade at one of its busiest boating access areas. The Morehead City Boating Access Area has new ramps and floating docks with a wave attenuator system, a new concrete apron and an improved, larger parking lot. The site also has improved traffic flow with access to the adjacent Division of Marine Fisheries and Institute of Marine Sciences parking lots for boaters on the weekends.

"We are continuously trying to improve access to waters in the coastal region of North Carolina, and this site is the perfect example of how three different state agencies worked together to make an existing access area even better," said Christofferson.

For more information on fishing in public, inland waters, including a map of Public Fishing Areas, visit www.ncwildlife.org/fishing. For more information on boating in North Carolina, visit the boating page at www.ncwildlife.org.

GEOFF CANTRELL/NCWRC

CALENDAR OF EVENTS

Monday, September 6

Join rangers at Medoc Mountain State Park near Hollister for a canoe or kayak float down Little Fishing Creek. The trip will last about three hours and begins at 2 p.m. Call (252) 586-6588 to register for this free program.

Friday–Sunday, September 10–19

Check out the livestock exhibits, midway rides, entertainment and the N.C. Wildlife Resources Commission's exhibit at the N.C. Mountain State Fair in Fletcher. Visit www.mountainfair.org.

Saturday–Sunday, September 11–12

Learn about wildlife heritage of Currituck at the fifth annual Currituck Wildlife Festival at Currituck County High School in Barco. Show features decoy carvers, wildlife painters, exhibits and decoy collections. Contact jmurray@delreysys.com.

Saturday, September 11

Learn about insects at BugFest 2010 at the N.C. Museum of Natural Sciences in Raleigh. Event features exhibits, activities and presentations on insects. Visit www.naturalsciences.org.

Saturday, September 18

Explore Hatteras Island's traditions and the world of working watermen during the fifth annual Day at the Docks in Hatteras Village. Festivities run from 10 a.m. to 5 p.m., followed by the blessing of the fleet. Visit www.dayatthedocks.org.

Saturday, September 25

Celebrate National Hunting and Fishing Day with the Roanoke-Chowan Wildlife Club's annual outdoor program of exhibits, crafts and other events in Winton. Admission is free. Contact Lynn Henry at (252)-794-3316 or lynnhenry@wildblue.net.

Readers should check with the contact listed before traveling to an event. Items for listing should be conservation-oriented and should be submitted at least four months in advance to jim.wilson@ncwildlife.org, or call (919) 707-0177.

Celebrate National Hunting and Fishing Day

In observance of National Hunting and Fishing Day on Saturday, Sept. 25, the N.C. Wildlife Resources Commission will host special events at its four education centers across the state.

"On a day designated to recognize the contributions of hunters and anglers to conservation, we want to take the opportunity to encourage the next generation," said Travis Casper, the state's assistant hunter education coordinator. "The future of fish and wildlife depends upon tomorrow's stewards."

National Hunting and Fishing Day will be celebrated at:

Centennial Campus Center for Wildlife Education in Raleigh. Call (919) 707-0205 for information.

Outer Banks Center for Wildlife Education in Corolla. Call (252) 453-0237 for information.

John E. Pechmann Fishing Education Center in Fayetteville. Call (910) 868-5003 for information.

Pisgah Center for Wildlife Education near Brevard. Call (828) 877-4423 for information.

Youth conservation in the outdoors is the theme for scheduled activities, which include archery, laser and pellet rifle ranges, fishing, wildlife identification, tree stand safety demonstrations, campfire cooking and more. Events and format will vary from center to center, but all are family-oriented and include contests and prizes.

JOHN CAMPBELL

Catching big fish is part of the day's fun.

National Hunting and Fishing Day is just a one-day example of year-round efforts by the Wildlife Commission to educate, encourage and involve people in hunting and fishing. The commission offers free hunter education courses, Becoming an Outdoor-Woman workshops, youth hunts, disabled sportsmen and mobility impaired hunting and fishing opportunities, and a fishing tackle loaner program.

Tar Heel sportsmen are among the most prominent and influential demographic groups in the nation, spending more than $1.7 billion annually on hunting and fishing activities. Statistics from a Congressional Sportsmen's Foundation report shows hunting and fishing directly supports 29,000 jobs and provides $818 million worth of paychecks in North Carolina. Along with hunting and fishing licenses, excise taxes on firearms, ammunition, archery equipment, and rods and reels generate $100,000 every 30 minutes—totaling more than $1.75 billion per year—for fish, wildlife and habitat conservation.

For more information on Wildlife Commission wildlife and fishing education centers, hunter education programs and what it takes to become a North Carolina sportsman, go to www.ncwildlife.org.

IN SEASON

This month, these seasons are open in North Carolina:

Canada Goose: Sept. 1–30. (Note: West of U.S. 17 hunting hours extended to ½ hour after sunset.)
Crow: Wednesdays, Fridays and Saturdays through Feb. 28, 2011.
Hatchery Supported Trout Waters: Through Feb. 28, 2011.
Mourning and White-Winged Dove: Sept. 4–Oct. 9.
Rails, Gallinule and Moorhen: Sept. 4–Nov. 12.
Teal: Sept. 11–29 east of U.S. 17 only.
White-tailed Deer:
Eastern: Bow season Sept. 11–Oct. 1;
Central: Bow season Sept. 11–Oct. 29;
Northwestern: Bow season Sept. 11–Nov. 5;
Western: Bow season Sept. 13–Oct. 2.
Wild Boar: Sept. 13–Feb. 28, 2011, only in Cherokee, Clay, Graham, Jackson, Macon and Swain counties. In the other 94 counties of the state, swine are considered feral hogs, and the commission does not regulate them.

There is no closed season or bag limit for groundhog, coyote, striped skunk and nutria. There is an open season for taking beaver with firearms or bow and arrow during any other open season for the taking of wild animals.

Check the *2010–2011 North Carolina Inland Fishing, Hunting and Trapping Regulations Digest* for bag limits and applicable maps or visit www.ncwildlife.org.

How Do Barrier Islands Migrate?

written by Clyde Sorenson
illustrated by Jim Brown

THE OUTER BANKS OF NORTH CAROLINA form a dramatic arc of barrier islands off the coast. Barrier islands are among the most dynamic landforms on the planet, and they must move to persist. The driver of barrier island migration is changing sea level. On the East Coast, when sea level increases, islands migrate to the west.

There are two main mechanisms that move an island landward. The first is overwash — during severe storm episodes, wave action carries sand from the beach over and through the dunes to the backside of the island. Most North Carolina islands are too wide for overwash to be a big factor in all but the most severe storms. Prior to the 1930s, though, this was an important mechanism for much of Hatteras Island.

The main way our islands move landward is through inlet delta formation. "Inlets" probably should be called "outlets," since they usually form when sound water piles up behind the island during a storm and blows through. Sand supplied by longshore drift along the beach moves into the sound on flooding tides, and off the beach on ebb tides. Eventually, the inlet closes, and all of the sand carried into the sound by countless flood tides is incorporated into the island. Most of the wide spots on the Outer Banks are former inlets.

The island's height is maintained — and the deltas are consolidated into the island after inlet closure — by wind movement of dune sands and overwash during storms. Any time we impede these processes through development, we impair the island's ability to move and jeopardize its continued existence.

Long, Strange Trips

written by Jim Dean

On most fishing or hunting trips, a failure to apprehend any fish or game is usually our biggest disappointment. But bad luck is not always so benign, and some of our forays into the great outdoors might be better described as doomed.

ILLUSTRATION BY JACKIE PITTMAN

I didn't think the stars were aligned against me when I once drove all the way to Cape Hatteras and realized I had forgotten my reels—I just felt stupid. But I wondered if a more sinister force was at play on a duck-hunting foray to the Little Alligator River when one member of our party overturned his brand new truck the first night by inadvertently driving it up the support wire of a telephone pole. That was, by the way, the same trip when we celebrated the successful righting of the truck by feasting on unctuous bear haunch stewed in Riunite. The plot turned truly evil when we discovered that our cabin's most urgently needed fixture was missing, leaving a hole in the floor.

"I didn't think the stars were aligned against me when I once drove all the way to Cape Hatteras and realized I had forgotten my reels—I just felt stupid."

Then, there was a trip years ago to Harkers Island when the gas tank on my buddy's Jeep leaked and filled up the tire well. Fortunately, we weren't incinerated, but our relief was tempered the following morning when my friend discovered he'd left his keys to the boat storage at home. When we finally got on the water, his boat blew out a hose fitting and sank. Other than that, the trip was uneventful.

Last spring, however, my friend Dan Cooney and I broke new ground for frustration—we spent all day going to the Roanoke River to fish for stripers and never got there.

"Let's take my boat," I suggested. "I've got it gassed up, batteries charged and ready for the season."

As we were hooking it up, I pointed out a steady stream of ants running back and forth along the transom. "You know it's a sign of good luck when passengers don't abandon a ship," I remarked cheerfully. I didn't mention that I had a vague foreboding that I was forgetting something.

We were halfway to Wendell when I realized what was missing. "I'm sorry, Dan, but I left the keys to the boat motor in the basement."

"No problem," Dan replied, graciously. "It's still fairly early so we've got time to go back and get them."

Forty-five minutes later, we were back on U.S. 64. Road signs began to appear indicating a closed lane ahead. We shifted to the right and kept going. A mile farther, we lost another lane. Traffic was bunching up. Within a mile, we were at a dead stop in the right lane. From time to time, we inched along, but the line of trucks and cars was virtually motionless as far as we could see.

It was nearly 4 p.m. by the time we spotted the Wendell exit, and pushing 5:00 when we reached it. All four lanes were blocked, there were blue lights everywhere, and traffic was being directed off 64.

We had little chance of reaching the river much before dark, and we could only hope no one had been hurt in an accident. Besides, what Dan had thought was an allergic attack was clearly blossoming into a bad cold.

"Why don't you call Ed McGee and take him tomorrow," Dan suggested as we headed home. "He and I were going, but I doubt I'm going to feel like it."

Day later. Ed and I had made it to the river and joined forces with David Fussell and Harry Bailes, who would be fishing in Dave's boat. As we were preparing to launch, I noticed that the ants were still on board. What was not on board, I soon realized, was a depth finder which is particularly useful on the Roanoke to locate heavier concentrations of stripers.

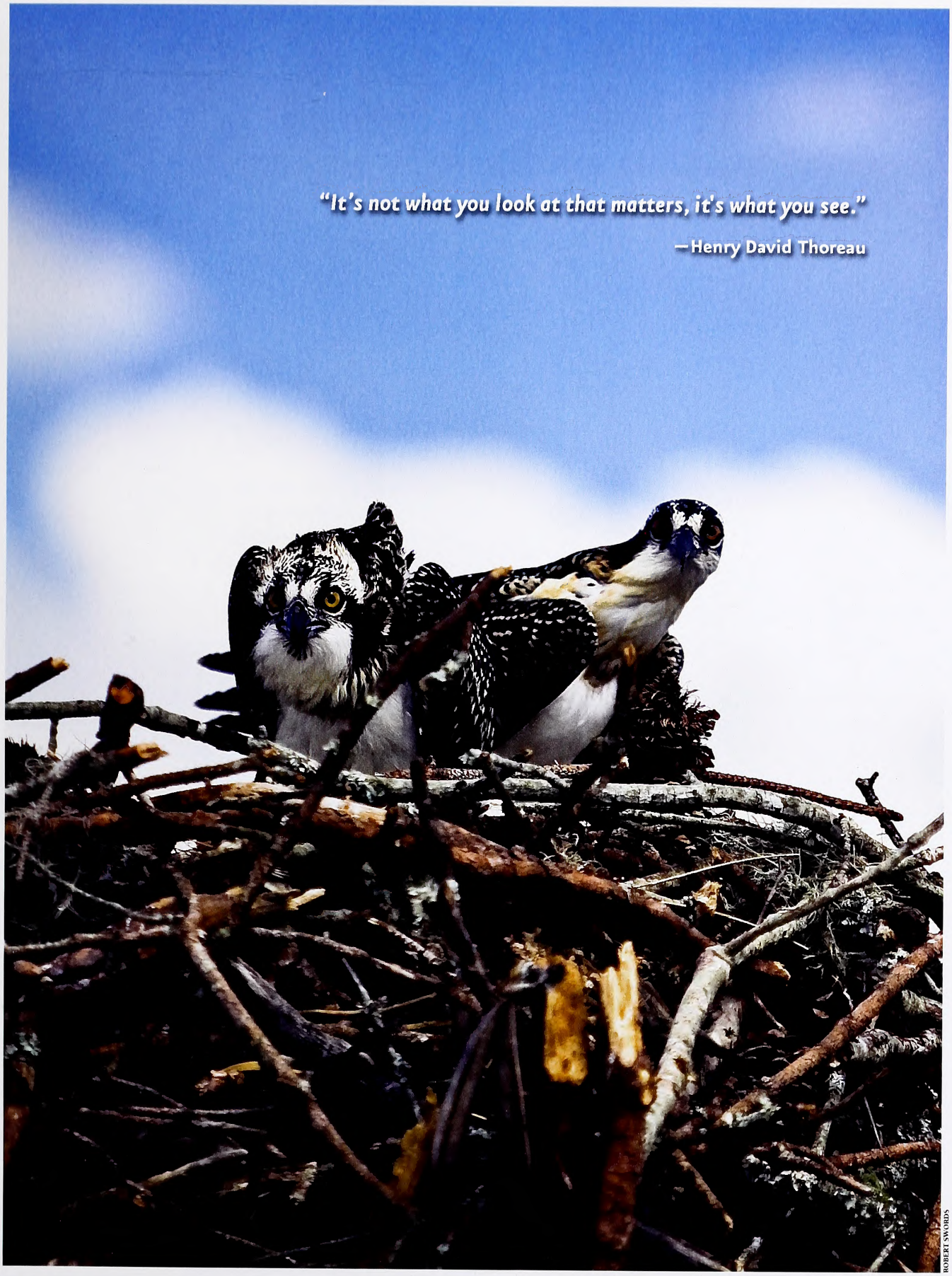
"No problem," suggested Ed. "We can ask Dave and Harry to keep us posted on where they find fish."

Indeed, they generously shared information with us, and by following their advice Ed and I managed to catch four small stripers while David and Harry were catching perhaps 25 or 30.

It would, of course, never have occurred to me to accuse them of duplicity because they typically outfish me four to one even when I haven't forgotten my depth finder. "Even so, I wouldn't blame you for choosing a more reliable fishing companion in the future," I explained to Ed.

"It's OK," Ed replied, patting me on the shoulder and repeating the outrageous untruth that all anglers know so well. "It wouldn't be much of a challenge if we always caught fish."

Two postscripts. As we were loading our gear to leave, I found the box in the car containing my depth finder. And back home, as I was putting the cover on the boat, I saw that the ants were still streaming back and forth along the transom. Despite our long, strange trip—and unlike the owner of the boat—they still seemed to know where they were going.



OUTDOOR MOMENT

Ospreys

IN THE OCTOBER ISSUE

JACK IGLEMAN

◀ EYES ON ELK

The Great Smokies' elk herd has inspired a new combination of picnicking and wildlife watching.

COOL CRAPPIES

The right techniques can net a cooler full of crappies during pleasant autumn fishing weather.

THREE IN THE TREES

It takes knowledge and travel to hunt all three North Carolina squirrel species — gray, fox and red.

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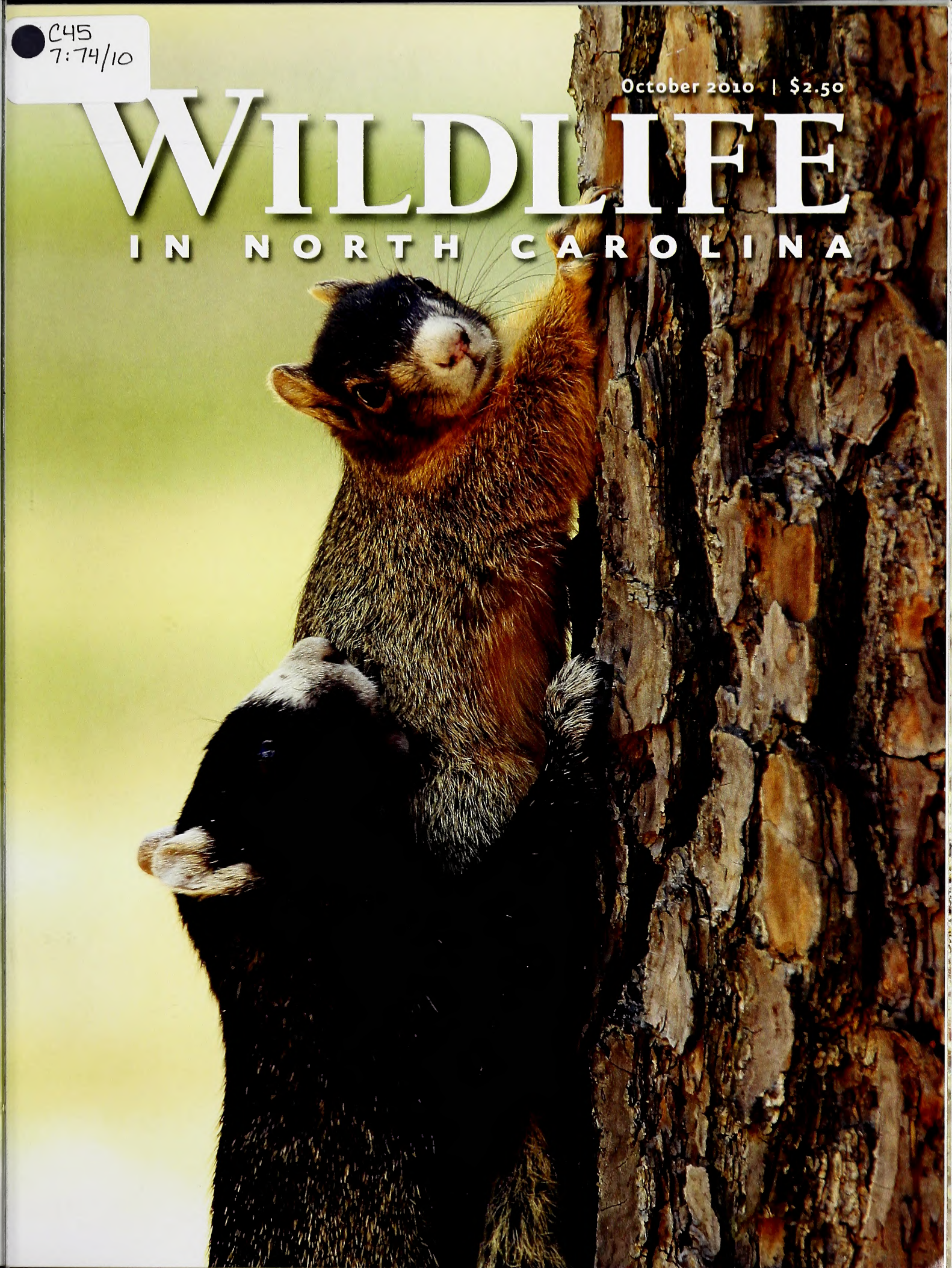
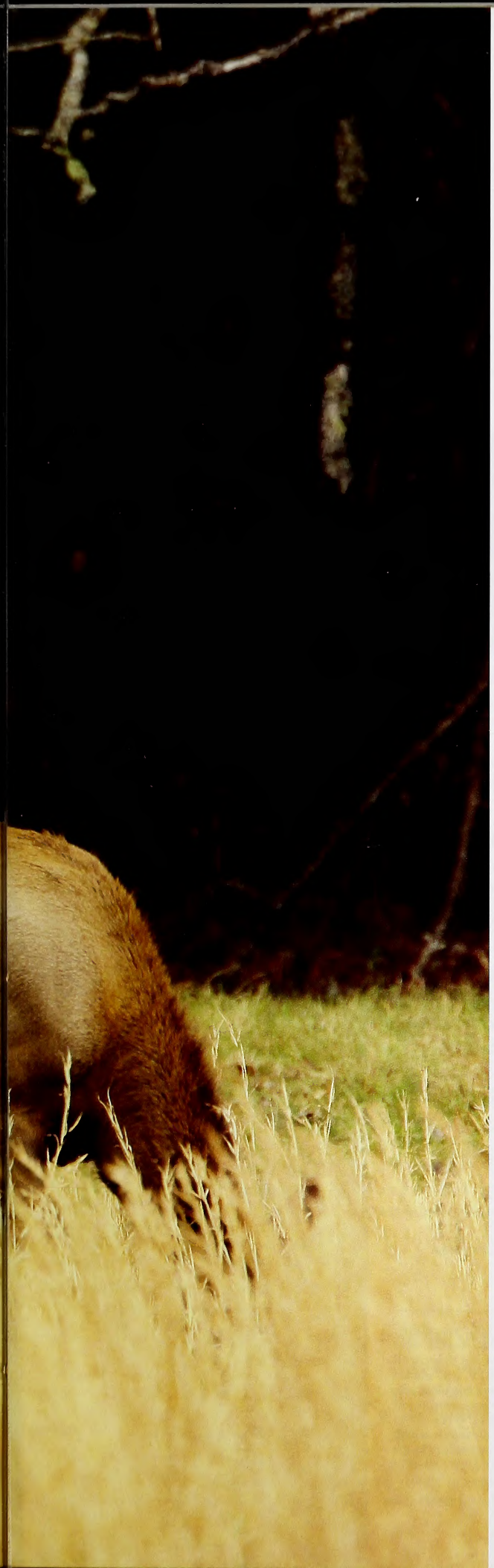
WILDLIFE IN NORTH CAROLINA



Populations of elk in Great Smoky Mountains National Park are closely monitored through tagging of the massive creatures. There are more than 100 elk in the park today.

PHOTOGRAPH BY TODD PUSSER.



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Cover: A mother fox squirrel moves her young from a nest box into a natural cavity. The fox squirrel is found in southeastern North Carolina and a small part of the northwest Mountains. PHOTOGRAPH BY TODD PUSSER.

Wildlife in North Carolina is the official educational publication of the North Carolina Wildlife Resources Commission. It is dedicated to the sound conservation of North Carolina's wildlife and other interrelated natural resources and also to the environment we share with them.

EDITOR'S NOTE

Big wild animals are so compelling, people can't help but be interested. It's no wonder biologists refer to them as "charismatic megafauna." Folks are fascinated with North Carolina's bears, deer, sharks, coyotes, alligators and elk. Ever since Great Smoky Mountains National Park brought in elk a decade ago, people have been drawn to the areas where the massive cervids (members of the deer family) congregate.

BILL LEA

In "Herd Mentality" (page 4), Asheville writer Jack Igelman discusses how watching elk has become a spectator sport, complete with fanatics, tailgate picnics, traffic jams, a home field (Cataloochee Valley) and bad behavior by fans. That bad behavior entails getting too close to elk and even feeding them. This could result in either A) elk becoming overly habituated to humans and eventually hurting someone, or B) elk dying prematurely after consuming improper food.

Most elk watchers stay the mandated 50 yards away from elk, or remain in their cars when the quarter-ton beasts are in the road. For those who follow the rules and don't ruin the experience for others, it can be an unforgettable encounter with the biggest of our state's suite of big animals. Families of humans can watch families of elk in a natural setting, an activity that is not possible many other places in the eastern United States.

Let's be completely honest: It's not only the presence of humans that complicates things—the mere presence of the elk is problematic, too. State wildlife officials were less than enthusiastic when the U.S. Park Service brought in the elk. Why? The species of elk that was once native to the Great Smokies went extinct some 200 years ago. The current elk, while closely related, is not the same animal. More significantly, the import of any type of cervid brings with it the risk of importing chronic wasting disease, a fatal affliction that could infect white-tailed deer. The state preferred to avoid the risk by avoiding importing elk.

Those concerns aside, there have been precious few problems with the Cataloochee elk so far. They are reproducing decently and seem to be healthy. For now, there is an uneasy peace with the elks' presence. So visit Cataloochee and check out the elk—but please keep your distance and keep your tailgate feast to yourself.

Greg Jenkins

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WILDLIFE IN NORTH CAROLINA

OCTOBER 2010 VOLUME 74, NUMBER 1

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Smells Suspicious

I am 55 years old and have purchased this magazine for 25 years. I will not renew after this year. In the back of the August 2010 issue is "Q&A with Gov. Bev Perdue." This section doesn't pass the political sniff test. It stinks like three-day-old road kill. It stinks almost as bad as the Mike Easley article ("Executive Environmentalism," Oct. 2004) stunk just before a previous election, and we now know how shady Mike Easley is. The "interview" reminds me of my high school days when a sophomore reporter with the school paper questioned a senior running for class president. Nothing was learned and the newsprint wasted would have been better used for meaningful dialogue or news.

If you want to convey something meaningful, interview some of our state wildlife biologists. More of their wisdom and insight are needed in the future when proposed changes to North Carolina regulations are put forth. They can also explain how the political appointees to the N.C. Wildlife Resources Commission are leading us down the road of mismanagement in proposing foolish changes to N.C. wildlife regulations. Fortunately, some of the wise proposed changes passed and the foolish proposed changes failed because of vast opposition from N.C. sportsmen.

Wallace Chambers, President
Piedmont Wildlife Hunt Club
Bahama

Greg Jenkins: Thank you for your letter about our Q&A with Gov. Perdue, Mr. Chambers. From time to time, we at the magazine have the opportunity to interview state leaders involved in conservation. This opportunity comes around only every four or five years.

I understand your displeasure with the feature, but I would encourage you not to throw out the baby with the bath water. I hope that Wildlife in North Carolina *contains dozens of informative, entertaining articles for every one that is offensive. We work hard to maintain a high standard here at the magazine, and we hope that you will reconsider your decision not to renew your subscription.*

Advice into Practice

Thanks for "The Mentor Advantage" in your August issue. It was a great reminder to those of us who hunted frequently in our younger days, but have tapered off in our golden years, that our responsibilities are not over. I owe my grandchildren a fair chance at becoming hunters. Soccer and basketball don't last all year long. I need to take the initiative to get them excited about hunting with some of my stories, and then follow up with trips afield.

The part of the article with advice for mentors brought up some things I hadn't thought about before, such as limiting expectations and keeping my young protégés comfortable. Using the advice in the article, I think I can create successful outings for my grandkids. This can be a new day and age for hunting if old hunters like myself will help make it so.

Henry Schiller
Charlotte

Looking over Jordan

I have just read the article "The Jordan Rules" in the August 2010 *Wildlife in North Carolina* on the Jordan Lake Nutrient Management Strategy. It's the clearest and most concise explanation I've seen of a complex problem and our attempt at a multilayered solution. My hat's off to the N.C. Wildlife Resources Commission for featuring this, something important for your readers to be aware of, and to the author, John Manuel, for a first-class job.

Stephen T. Smith, Chairman
N.C. Environmental Management Commission
Raleigh

I fish at Jordan Lake a couple of times a month, and it's definitely no secret that the algae situation there is a mess. If it's going to cost $1.5 billion to clean up Falls Lake, I can't imagine what the price tag for Jordan might be. Regardless of the amount, we have to do whatever it takes to get our drinking water supply cleaned up. We can't continue to choke Jordan Lake with pollution, or we will be the ones choking with thirst while standing next to an unusable lake.

Harold Stephens
Chatham County

We Want Your Feedback

Do you have a comment about content in *Wildlife in North Carolina?* Questions about something you read or have seen? Send us an e-mail at letters@ncwildlife.org. If you want fellow readers to know your opinion, this is the place. If you want an expert to answer your question, we will do our best to help. We hope to hear from you!

Credit Default

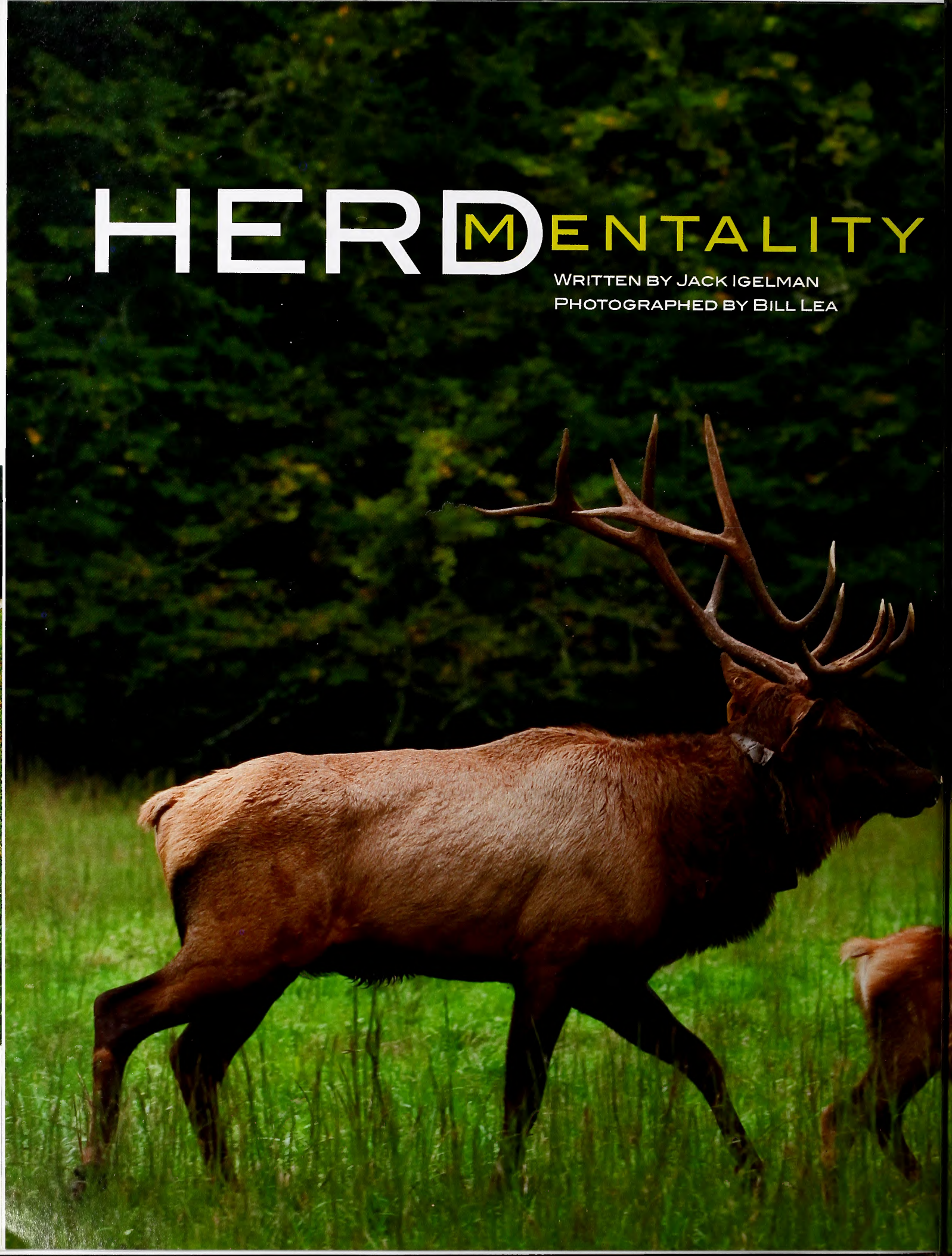
The bylines for Jim Wilson's story "Streams of Consciousness" in the Sept. 2010 issue failed to appear on the opening pages of the article. A software error resulted in the credits being covered up by Joe Mahler's artwork. Also, due to a printer's error on the hunting seasons centerspread, the word "vies" was inserted in place of "species" at the top left of page 21.

write us

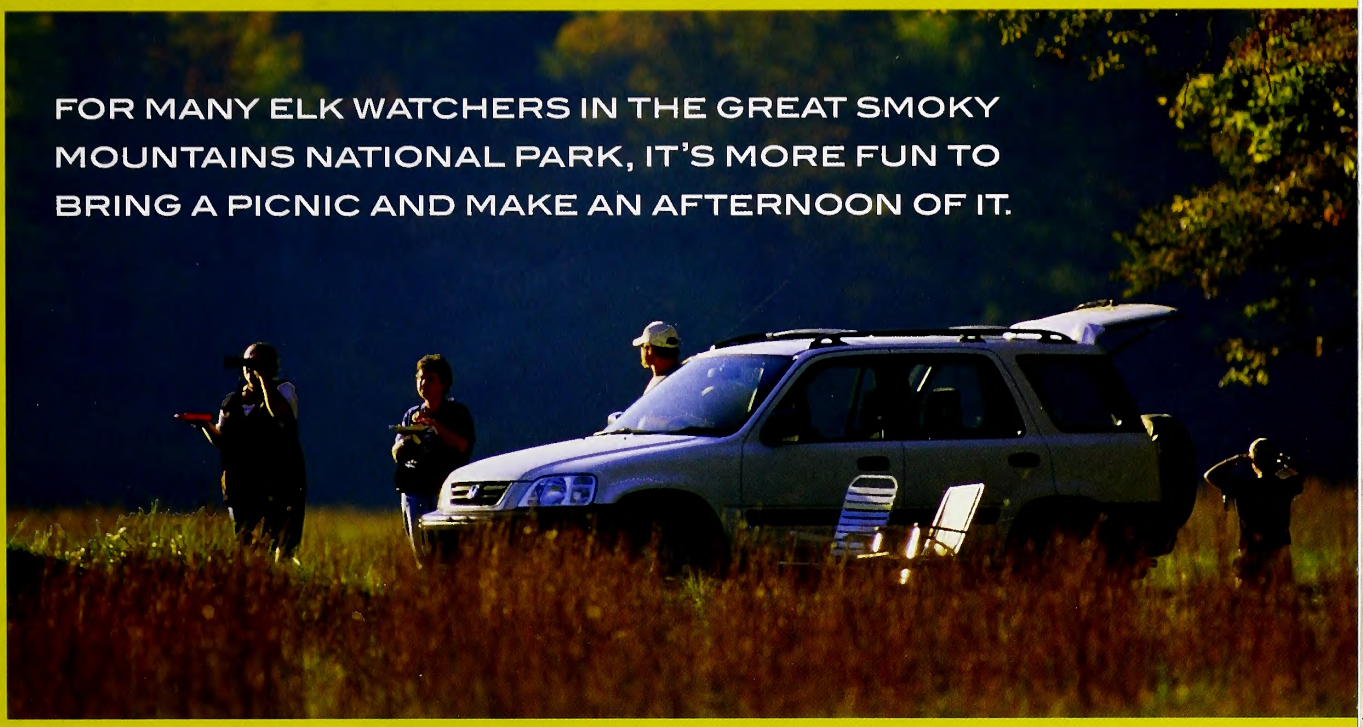
Letters should be sent via e-mail to **letters@ncwildlife.org** *or through regular mail to* Letters, Wildlife in North Carolina *magazine, 1712 Mail Service Center, Raleigh, NC 27699-1712. Please include your name, address and daytime phone number. Letters chosen for publication may be edited for clarity and length.*

HERD MENTALITY

WRITTEN BY JACK IGELMAN
PHOTOGRAPHED BY BILL LEA



FOR MANY ELK WATCHERS IN THE GREAT SMOKY MOUNTAINS NATIONAL PARK, IT'S MORE FUN TO BRING A PICNIC AND MAKE AN AFTERNOON OF IT.



Crisp autumn afternoons are a sure sign that the all-American parking lot ritual of devouring meat and processed food is under way. Yet, a ballgame isn't the only reason to weigh down a tailgate with a smorgasbord of lip-smacking dips and dishes. In the Great Smoky Mountains National Park (GSMNP) there is a herd of elk.

Known for its dazzling vistas, the 520,000-acre park bisected by the North Carolina-Tennessee state line is now also the toast of wildlife aficionados. Almost two centuries since they last roamed the southern Appalachians, the elk have returned.

Typically, by late afternoon, members of a herd of Canadian elk re-established in the Smokies in 2001 and 2002 will assemble and graze in the fields of the park's Cataloochee Valley. And so will the people—lots of them—some reclining in camp chairs with a plate of food just yards from these elegant creatures. Though tailgating in a national park may seem strange, the growing volume of mobile buffets lining this valley's lone gravel road just one hour from Asheville has become as ordinary as third-and-long. The results of the increased visitation are traffic jams and the typical muddle of stuffing too many people into too small an area.

TAILGATING AND WILDLIFE VIEWING HAVE BECOME A SORT OF NEW FAMILY TRADITION THAT IS, ONCE AGAIN, TRANSFORMING THIS LOVELY VALLEY, PARTICULARLY ON WEEKENDS IN LEAF SEASON AND DURING THE FALL ELK MATING SEASON, KNOWN AS THE RUT.

A gravel lot next to an old barn near the end of Cataloochee Road is ground zero for the congregations of wildlife spectators. While cars come and go, hoping to catch a fleeting glimpse of the wild animals, there are often scores of vehicles dug in for the afternoon. On a recent October day there is an orange-and-black Harley-Davidson-branded Ford pickup that dwarfs the Subaru wagon and compact Toyota next to it. There is also a fleet of vehicles from northeast Georgia with three generations of the Lovell family. Their tailgates are loaded with an assortment of dishes: steaming casseroles, charred hot dogs, desserts and bowls of colorful salads.

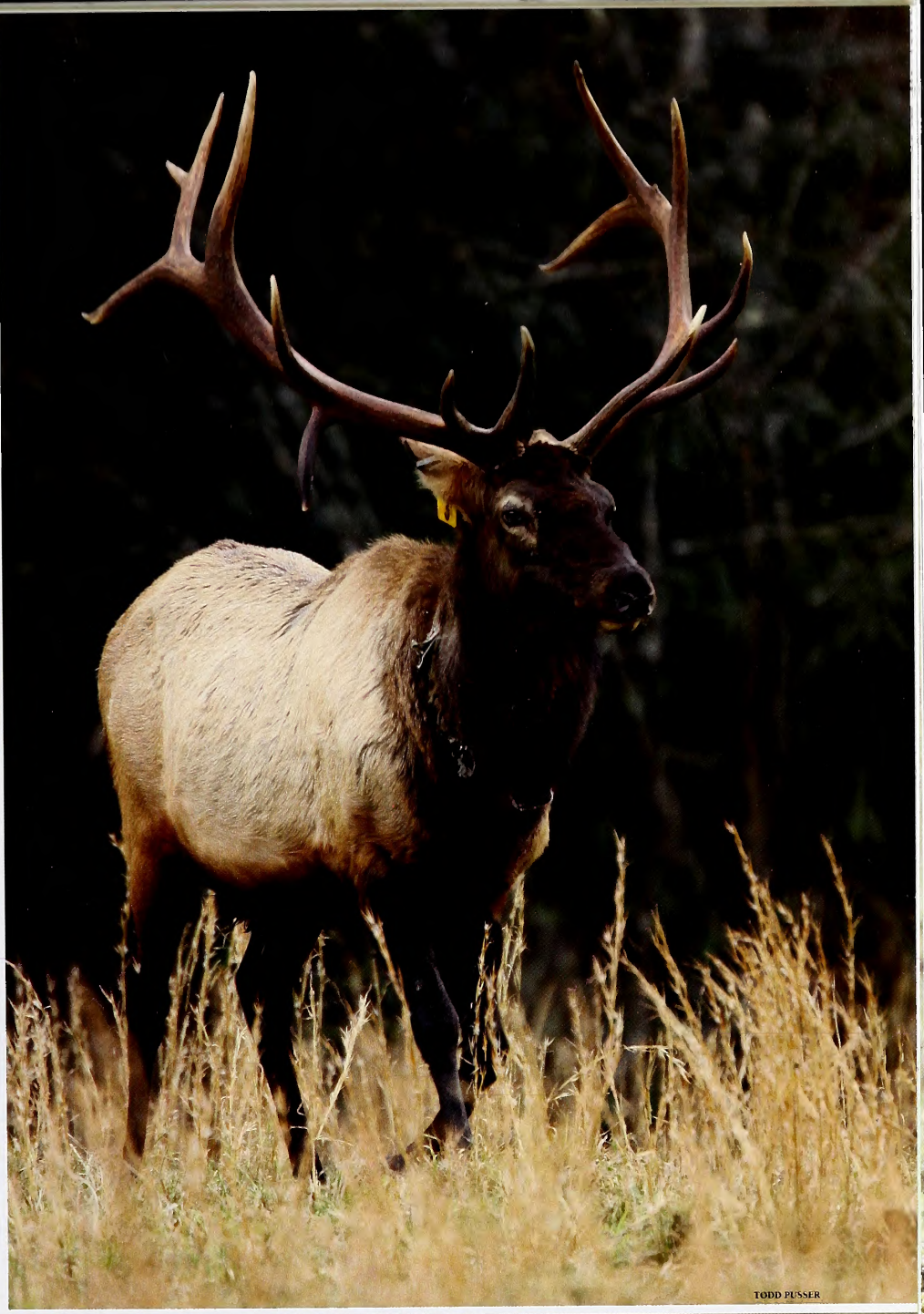
"It is pretty nice to come to a place like this," says Don Lovell of Persimmon, Ga., clutching a soda while leaning against a white Jeep. "I like the family atmosphere and seeing the elk. It's special to show the kids things they have never seen. For them it's a big thrill."

A thrill not just for the Lovell children. Since the re-debut of the stately animals, affection for the Cataloochee Valley is spreading like kudzu. Tailgating and wildlife viewing have become a sort of new family tradition that is, once again, transforming this lovely valley, particularly on weekends in leaf season and during the fall elk mating season, known as the rut. So, as the park's most recent tourist mecca fills with people and their vehicles on busy autumn weekends, it's tempting to regard the reintroduction of the elk suspiciously. Yet despite the havoc, the fresh interest may be the best thing for it.

The historic buildings and serenity of Cataloochee have long attracted visitors to this remote valley. Volunteer elk educator Barbara Smathers of Waynesville is one of them. Her grandfather was born here, and she's been making the trip since she was 3 months old. Smathers believes it's not just the animals that lures people here; it's the human history of the valley that visitors can relate to. "People think there's nothing here, but the elk and the legacy of the people who lived here bring [the history] closer to them." The valley was first settled in the early 19th century, and in its heyday there were more than a thousand residents. By the time the park was established 75 years ago, only a few families remained. Now, only a handful of the original structures—a one-room schoolhouse, a chapel and several homes—still stand, as if frozen in time. Though most of the remaining edifices are void of furnishings, there are still desks bolted to the schoolhouse floor, and the creaky staircase and worn wood floors in one of the homes are eerie reminders that people once lived here.

And it's likely that elk once did, too. They flourished in the southern Appalachians prior to the arrival of European settlers. However, by the 20th century the population was decimated by habitat loss, competition from livestock, disease and overhunting. By 1900, the number of elk in the United States had been reduced from 10 million to less than 100,000.

By law, wildlife watchers must keep their distance from elk and allow animals to clear the roadway before people can proceed in their vehicles. Bull elk can grow as large as 700 pounds, so caution is key when viewing these animals.



TODD PUSSER

TODD PUSSER

In 1990, the Rocky Mountain Elk Foundation (RMEF)—an organization committed to the future of the animals and their habitat—proposed that the GSMNP consider reintroducing a herd. Although attracting interest to the park was an obvious advantage, the real benefits to the park, RMEF believed, would be ecological. "The Smokies have always had open grassland, and elk were the primary grazers," explains GSMNP wildlife manager Joe Yarkovich. "Bringing the species back into the park is part of a broader plan to find a more suitable balance to the park's ecosystem, and a primary mission of the National Park Service is to preserve native species." Since there was broad public and private support for the project, and because of other successful reintroductions in the park (river otters and peregrine falcons, for example) and herds of elk elsewhere, the park accepted.

Funded by the RMEF and the Friends of the Smokies, the first 25 arrivals came in February 2001 and were imported from the Land Between the Lakes National Recreation Area on the Kentucky-Tennessee border, following an earlier relocation from Alberta. (Though there are several species of elk, the

TODD PUSSER

F. EUGENE HESTER

Elk are fascinating to watch, whether they are sleeping, strengthening family bonds or roaming the Cataloochee Valley. A telephoto lens (opposite page) is one of the recommended ways to get a close-up look.

variety that once roamed the southern Appalachians is now extinct.) Initially several high grassy balds and Cades Cove on the Tennessee side of the park were short-listed as potential habitats. In the end, the park opted for Cataloochee because of its open fields and relative isolation. Later, in 2002, another 27 animals were added to the herd.

In the early stages of the project the transplants had problems adapting to the environment's unique threats, such as black bears and disease. The survival rate of calves was not encouraging, and projection models indicated that the overall population trend was decreasing. Fortunately, over time the herd began to adapt, thanks in part to the relocation of bears over several years. The elk went from grazing exclusively in the fields to finding their meals in the forest, where food sources such as acorns are more abundant. And they developed more effective protection of their young from the threat of bears. "You can expect to lose a few, but I don't think anyone would have anticipated such a quick adaptation," says Yarkovich, who adds that wildlife managers are only now beginning to understand the complexities of restoring wildlife populations.

Currently, at the conclusion of the project's eight-year experimental phase, the number in the herd has surpassed 100. Although encouraging, it's a humble figure relative to the more than 1,000 head of black bears, the icon of the park. Although elk may not supplant the bear as the park's symbol, they have become a close second. The nearby town of Maggie Valley in Haywood County, for instance, claims elk as its mascot. The animals' draw is evidenced by the tourist towns' oft-photographed roadside replicas. But it is the authentic elk that are drawing the most attention.

Prior to the reintroduction, the remote Cataloochee Valley averaged 75,000 visitors annually. Since then visitation has doubled, and the valley has become the national park equivalent of a Disney experiment gone wild. That's put a heavy burden on its port-a-johns, trash receptacles and narrow gravel lane. On a recent weekend Mark LaShell, one of two rangers stationed in Cataloochee, spent his entire shift directing gridlock traffic along a particularly narrow stretch of the thoroughfare. LaShell is aided in this task from May through November by several dozen volunteers who make up the Elk Bugle Corps. One of them is Smathers, who was hooked when she witnessed the first load of elk deployed and listened to the first bugle. The thrill of that moment is one reason that she enlisted. Established in 2007 and modeled after similar organizations in other national parks, the volunteer group not only assists with traffic but also helps keep visitors safe.

Answering questions keeps these volunteers plenty occupied. The most frequent inquiry, Smathers says, is how to get out of the valley. Answer: Since there is only one road that enters the valley, it is, of course, the only way out. Next among the common questions is: What time do the elk come out of the forest and into the fields? Answer: Typically, the curtain call is in the mornings, on cloudy days, after storms or, most often, late in the afternoon, when the park is crawling with visitors.

NATURE'S WAYS

How Do Bull Elk Assert Dominance?

See Nature's Ways, page 39.

Though the dividend to the patient watcher may be simply a distant and anonymous grunt or bugle, pay dirt is when the elk mingle casually with delighted sightseers aiming cameras from automobiles stopped in their tracks like a handful of tossed jacks. And that kind of interaction is precisely the appeal of this herd. With other wildlife in the park, such as bears or peregrine falcons, encounters are rare, fleeting and distant. The elk give an opportunity to connect with wildlife on a more intimate level and have brought a living presence back to this beloved valley. Their return, it seems, provides a sense that things are as they should be.

Still, this is no petting zoo. In fact, says Yarkovich, managing people, not elk, may be the ultimate challenge—in particular, keeping overzealous lookers a safe distance away from the quarter-ton animals. Although encounters are rare, the interaction of humans and elk is evident. Many gazers never leave their seats, but others march far too close. This, of course, is of grave concern, since elk outweigh most people by several hundred pounds and are surprisingly swift despite their girth. "They may look docile, but they are wild animals," promises LaShell. "People need to be aware that the potential for an attack is definitely there. Elk can be dangerous." Although there hasn't been physical contact between an elk and a human since the herd was established in the park, it may be only a matter of time. Visitor safety is paramount, LaShell says, and a human fatality might complicate the management of the elk and put the future of the herd at risk.

Still, it's the stuff in plastic wrappers and tin cans that is most lethal. Ultimately, the greatest threat is introducing elk to chicken bones and Fritos—exactly the type of food that tailgaters and other visitors are bringing with them. "The food is the worst thing we can do to them. Once they get the taste for it, they seek it out," says LaShell, who points out that human food can cut the life expectancy of wildlife in half.

Though a threat, humans are also one of the herd's greatest allies. In fact, says Yarkovich, the elk project simply would not have been possible without the human dimension. And many, including LaShell and Yarkovich, argue that the throngs of new visitors, particularly the tailgaters, are crucial to the protection of the park. "I can hand out tickets all day long," says LaShell. (For instance, willfully approaching within 50 yards of an animal is illegal in the park.) "But what will protect the park are people who are willing to fight for it. We need more people connected to the Smokies. That will make a difference."

No doubt that kind of interest comes with a price, but tailgaters and other wildlife watchers may be on to something. Waiting for elk takes patience, and those sitting back watching the light change may be among the visitors getting the richest experience. Yarkovich believes that the increased visitation is evidence of the project's strength. Nevertheless, this year the park will conduct an environmental assessment, using scientific data and public input to examine the long-term chances of the herd's survival and to plan for its future. The results of the analysis will determine whether the park continues to manage the herd or if it allows the animals to make a go of it on their own. It is also possible—but unlikely, according to the Park Service—that the herd will be removed. Yarkovich is encouraged by the data so far, but the survival of these powerful creatures in the Smokies is hardly assured.

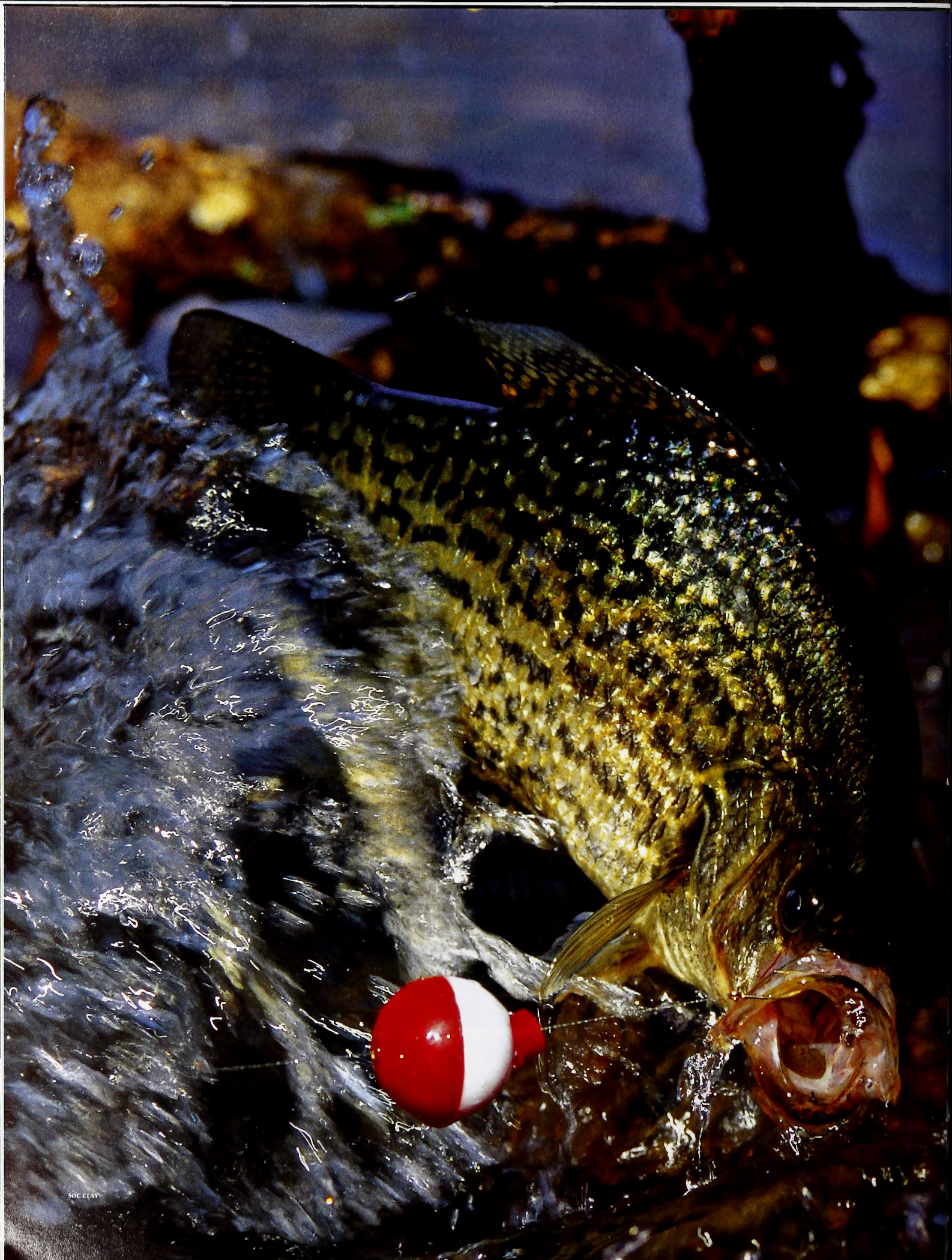
In the meantime LaShell and Yarkovich are hopeful that more funding to improve visitor facilities—such as increased parking and a more gratifying alternative to bright orange port-a-johns—will help build on the budding tradition of wildlife watching in this picturesque Appalachian valley.

"There is no place like it," says tailgater Lovell. "We are here to enjoy the creation."

Jack Igelman, a freelance writer living in Asheville, is an occasional contributor to WINC.

THOUGH THE DIVIDEND TO THE PATIENT WATCHER MAY BE SIMPLY A DISTANT AND ANONYMOUS GRUNT OR BUGLE, PAY DIRT IS WHEN THE ELK MINGLE CASUALLY WITH DELIGHTED SIGHTSEERS AIMING CAMERAS FROM AUTOMOBILES STOPPED IN THEIR TRACKS LIKE A HANDFUL OF TOSSED JACKS.

TODD PUSSER



COOL CRAPPIES

Don't wait for spring slab spawning to take advantage of great fishing action. Autumn is a wonderful time to pursue crappies, especially in Piedmont lakes and ponds.

A formation of cormorants skimmed Jordan Lake as an overcast sky illuminated the shadowless surface. Freddie Sinclair of Clayton didn't notice, as he was intently watching the array of 12 long black fishing rods in rod holders mounted on the front of his boat. Cars whizzed over the Farrington Road bridge as Sinclair plucked a rod from its holder and brought a crappie to his net.

To the experienced angler it was obvious Sinclair was crappie fishing, but the trees surrounding Jordan were tinged with orange; mostly leaves, but deeper in the woods the blaze orange of deer hunters. It was November, and Sinclair, like most of the other fishermen bobbing around in the lake, was fishing for crappies.

For many sportsmen, autumn is the time for hunting, football and surf fishing. Crappie fishing, for most, is a spring pursuit, when the fish move into shallow waters to spawn. With the fish on the banks or in the backs of coves, anglers in all grades of craft, from center consoles to kayaks, descend on lakes and ponds to take advantage of the spring largesse.

But slabs are available year-round, and the fall and winter can provide steady action to anglers who know what they're doing, and that means the fish can be anywhere from deep on the bottom to sniffing shad in the shallows. Deep is relative in North Carolina reservoirs, but for crappies 20 to 30 feet down is deep. Shallow is 3 to 5 feet.

Finding Fish

Sinclair studied his fish finder as he eased his 19-foot Stratos walleye boat around. The fish finder showed balls of shad suspended under the boat. "The fish are usually under the bait or behind it," said Sinclair. "These big fish come out of the deep and follow the bait to the backs of coves," Sinclair said as he unhooked a nice pound-and-a-halfer and deposited it in his live well. "They're using this 20-foot[-deep] channel as a highway."

written by Mike Zlotnicki

MIKE ZLOTNICKI

Tournament crappie angler Freddie Sinclair tends to his spider-rigged setup, watching for crappies and baitfish on the depth finder and keeping the trolling motor at a constant slow speed. Anglers should fish near channel edges because crappies like to hang out behind or underneath bait in cooler weather.

MIKE ZLOTNICKI

MIKE ZLOTNICKI

He should know. Sinclair spends about 100 days a year in search of crappies, and guides as well as fishes tournaments. In fact, his trolling technique (known as fast or slow trolling, depending upon the angler) is a downsized version of the popular slow-trolling with menhaden that he used in his king mackerel fishing days.

Jay Garrard of Durham is another year-round crappie expert who doesn't eschew slabs during deer season. (But you will find him in a tree on occasion.) He's also a guide and competitive angler, though lately bass tournaments have caught his fancy.

"I like to find deeper ledges, and flats off those ledges," said Garrard. "I really like the ledges when it's colder. Basically, you try to find the channel ledge and look for bait or fish."

Into November and December, Garrard will typically look for crappies in 12 to 15 feet of water, down to 20 feet in the dead of winter. Garrard said that as the water cools, some of the crappies may follow the shad to the creeks, but then they return, often holding tighter to cover if the sun is shining bright. Marker buoys can be indispensable in deep-water crappie fishing, allowing an angler to mark channel locations and other crappie-attracting structure.

"The last thing you want to do is put out 20 feet of line in 13 feet of water," said Sinclair. "The buoys give you a visual reference."

A common visual reference for anglers in some lakes is standing timber. If there's a creek or river channel nearby, Garrard said, that would be a good place to search for fish. On reservoirs, bridges often span old river channels, so that would be a good place to start looking as well.

Catching Fish

Rigging up for serious crappie fishing can be just as specialized as for any other type of fishing. As usual, the devil is in the details.

Serious crappie anglers use one of two methods: spider rigging (tight-lining) or "fast" trolling. (Fast is relative; 1 mile per hour is a rough average.) Most spider rigging is done from bow-mounted rod holders with vertical jig presentations. Trolling is done from gunwale and aft-mounted rod holders. Those wishing to employ rod holders on a seasonal basis can purchase clamp-on holders. While on Jordan one windy day, Sinclair was "tight-lining" jigs from his stern rod holders in order to keep the jigs from

Rigging up for serious crappie fishing can be just as specialized as for any other type of fishing. As usual, the devil is in the details.
D. EUGENE HESTER

MIKE ZLOTNICKI

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A tackle box filled with a colorful variety of curly-tail grubs and lead head jigs is necessary for successful crappie fishing. Hooks are often tipped with a small live minnow.

bouncing too much, which would happen if they were in bow holders.

To be sure, crappies are caught with all manner of rods ranging from graphite to cane, but serious slab hunters use specially designed crappie rods that range from 8 to 16 feet and resemble fly rod blanks. The most popular manufacturer is B'n'M Fishing. The limber rods with sensitive tips aid greatly in detecting a gentle bite and keep the hook from ripping the tissue in a crappie (hence the moniker "papermouth"). Spinning reels with 6-pound test are typical.

Although both trolling and spider rigging can be employed at any time, Sinclair prefers to troll in the shallows in the spring with the baits 30 to 40 feet behind his boat, and troll or spider rig in open water in the fall. It's easier to pinpoint depths and structure with vertical presentations, and in the fall and winter the crappies will often "stack up" in schools of like-sized fish. It certainly makes sense to troll an area to find fish, toss out a marker buoy and then zero in with a straight-line strategy.

The old adage "size matters" certainly applies to crappie fishing where jigs are concerned. Only, smaller can be better. Although some folks troll small crankbaits and others use a two-hook rig with the weight on the bottom (sometimes referred to as a Kentucky rig) for spider rigging, small jigs are the overwhelmingly favorite bait, usually tipped with a small minnow.

For trolling Sinclair will use 1/64- to 1/16-ounce jigs. When spider rigging he'll use 1/4- to 1/2-ounce weights about 18 inches above his jigs, with small split shot holding them in place. He'll also use No. 2 gold and red hooks with just minnows on them. "I like to fish the lightest weight I can, but that's dependent upon the wind conditions," said Sinclair.

Most of his jigs are dressed with tube bodies in various colors. For trolling Sinclair uses a loop knot; for straight lining he uses a clinch knot. "There are times the color can be very important, when crappies will hit only one color," said Sinclair. "When the barometric pressure is high, I like to use something with red in it." Garrard usually employs a bare 1/8-ounce jig head tipped with a small minnow and tied to his 6-pound-test Izor line. "If they're real finicky, I'll use a 1/16 or a 1/32," he said. "I'll use a split shot above it when I'm fishing deep."

For both trolling and spider rigging, rod tips are at least horizontal to the water, and preferably angled down, the better to keep the wind out of the line.

One thing to note for trolling is that the type of jig body will influence the depth where the jig rides. A fliptail body will create more drag and thus cause the jig to ride higher in the water column than a tube body. A jig with no body has the least amount of drag. Spinner blades attached to jigs, such as the popular Roadrunner brand, will also create drag and cause the jig to ride higher. It's all a trade-off, and often a crapshoot, but by fishing different weight, color and jig body combinations, you will let the crappies eventually tell you what they want.

Crappies have long been thought of as a spring thing by anglers eager to cash in on easy fishing. But after those spring filets are memory, Tivo the game, case the deer rifle and kennel the duck dog. Dress warmly and start with the river or creek channel. There are slabs to be had, if you know where to look. ◆

Mike Zlotnicki is the former outdoors editor for The (*Raleigh*) News & Observer. *He lives in Garner with his wife, three daughters and a German shorthaired pointer.*

FURTHER READING

Crappie anglers seeking a graduate degree in the subject should check out "The Crappie Book: Basics and Beyond," by noted outdoor writer Keith Sutton (Stoeger Publishing Company, 2006). It pretty much covers everything you'd ever want to know about crappie fishing, including meal preparation at the end. Get your grease hot!

PIEDMONT PAPERMOUTHS

To get the lowdown on local crappies, I contacted Brian McRae, Piedmont fisheries research coordinator for the N.C. Wildlife Resources Commission. "Spawning season for crappies in North Carolina typically lasts from March through May; black crappie begin to spawn when water temperatures reach 60–68 degrees, and the white crappie spawn when water temperatures reach 58–64 degrees," said McRae. "As for frequency, the spring is their one spawning time; however, females will spawn with multiple males during their spawning event. Black crappie females produce between 11,000 and 188,000 eggs; white crappie females produce between 2,900 and 91,700 eggs."

McRae said that biologists typically have their greatest catch rates in trap nets in the fall at sites on or near points. He theorized that the crappies follow shad into coves, where the shad are seeking zooplankton in warmer, shallower water.

McRae said that crappies are one of the most popular species in our waters. "In terms of popularity, it really depends on the reservoir and what other sport fishes are available," he said. "For example, it was found to be the third most popular fishery at Lake Norman, behind largemouth bass and striped bass; however, it was pretty well tied for the second most popular fishery at Lake Gaston, behind largemouth bass, with little differences in angling effort toward crappie, striped bass and catfish. However, it is definitely one of the most popular harvest fisheries regardless of the reservoir."

There are two types of crappie: black and white. Black crappie usually have dark blotches on their sides, whereas white crappie usually have dark vertical bars on their sides, McRae said. "Black crappie have seven or eight dorsal fin spines, but white crappie have only five or six. Because hybridization sometimes occurs between black and white crappies, and water quality often affects fish coloration, counting dorsal fin spines is the best method for distinguishing between the two species."

The state record black crappie weighed 4 pounds, 15 ounces and was caught in Asheboro City Lake No. 4 in 1980 by Dean Dixon. The state record white crappie weighed 3 pounds, 12 ounces and was caught in the Tar River Reservoir in April of this year by Ray Patterson. Both fish fell to a live minnow.

REQUIEM *for a* RETRIEVER

Fetching ducks was in her past when Kate came to us to lie on a sofa, find herself a boy and win a place in our hearts.

WRITTEN BY SHARI SMITH
ILLUSTRATED BY GARY PALMER

WE SAID GOODBYE TO KATE THIS MORNING. SHE WAS READY. I WAS NOT.

Big Pond's Cannonball Kate came to us when my dear friend, Ann Viklund, thought she would help me get over the grief for my own Paja, then a year gone. Kate had earned her master hunter title, been a good mother to two big litters of puppies—eight in one, 13 in the other—and brought back vests full of ducks for Ann's husband, Max, Kate's trainer and friend. It was time for her to find a sofa cushion on which to sleep and shed, and time for me to love another good old working dog.

But Kate, too much woman to be anybody's second pick, chose my son. She had a boy and Walker, after 13 years of living in a house full of dogs, had one that liked him best, best of all.

If Walker threw the retrieving dummy a hundred times a day, Kate fetched it up every time, limping as fast as an arthritic shoulder would carry her, wagging her tail when he took it from her, begging him to throw it again. He would nag at me until I abandoned whatever I was doing to come and hold Kate, turning her away so she couldn't see as Walker would hide the dummy in the bushes or the hedges or one of the flower beds I had recently gardened to perfection. Walker had himself a retriever. Kate, she had her very own boy.

She would stand in front of him as he watched television in the late evenings, telling him it was time for bed, and to my amazement Walker would give in: "OK, old girl. Guess you're tired." When her shoulder would no longer allow her the leap onto his bed, Walker would pick her up, placing her head on a pillow, pull the covers over the two of them, and there she would stay until morning. There's many a night I don't think she moved.

As recently as last weekend, she would choose his room for sleep, even when it was full of the friends he has had since kindergarten. I would open the door in the mornings to find Kate in a tangle of arms and legs in sleeping bags, boxer shorts and Braves T-shirts, once with her paw right square on Cole McGraw's forehead, her back against Walker's, sharing his pillow, all of them open-mouth-snorin'.

Cole's brother, Hayden, enough younger to wear on the tolerance of boys five years his senior, turned to Kate when they turned on him. Leaving of his own accord or being banished from their talk of girls and Carolina basketball, Hayden would find her on the couch, slide under Kate's heavy, sleeping head and stroke her neck, leaning over her to whisper the secrets boys tell only to dogs, secrets I could not hear from my place in the kitchen. Kate would eventually sit up, next to Hayden, putting her head against his, making it hard to tell the stopping and starting of her coat and his blonde head. Hayden would call to me, wanting a witness. "She likes me." And I would say she sure does. Kate knew when to be a momma.

Hayden will grow to be a dog man. You can just tell. I'm not quite sure where it comes from, the love of dogs, the pull to stand in the cold, in rain and worse just to watch them work. Maybe it is born in you. Maybe it is handed down through stories. Either way, my own adoration for a dog that knows an honest day's work comes from my daddy and the tales of dogs I know only through legend, from begging him to "Tell it again" when he insisted I already knew the story of the best pointer he ever saw.

I know from listening that hunters fret when hunting over a dog unfamiliar to them. My father was no different and worried about the doctor who came to hunt the farm ground my family worked to put food on the table and in the silos for winter. Dad can still tell it like he saw it an hour ago, the pointer so sure he was moving in the right direction that he climbed the farm fence, paid no mind to the barbwire stretched across the top, and froze there, balanced in a point, trying with all he had to tell the men that the birds they hunted were there, on the other side.

Unable to hold his balance, the dog fell to the ground, and to the sky rose a covey of 25 birds. "We was so amazed at that dog and what we was seeing, not one of us could get a gun up." The dog hung his

I would open the door in the mornings to find Kate in a tangle of arms and legs . . .

Leaving of his own accord or being banished from their talk of girls and Carolina basketball, Hayden would find her on the couch, slide under Kate's heavy, sleeping head and stroke her neck, leaning over her to whisper the secrets boys tell only to dogs, secrets I could not hear from my place in the kitchen.

head in shame at having flushed the covey, failing in the impossible feat of holding point on a stretch of barbwire. They gave him a pat, all the forgiveness he needed, and they hunted over him, finding singles for the rest of the day. That was 50 years ago, but when my daddy tells the story I can smell the cold and see the wire sway with the weight of a dog doing his best on a hunt that took place before I was born.

When my father was a teenager, a barber gave him a pup out of his female known to be the best coon dog in the county. She'd been bred to Jack, a black-and-tan "registered" dog that won every field trial he entered and served as the standard to which all treeing dogs were measured. My daddy was in high cotton, a teenager with a pup out of Jack, and in six months had him running a trail and treeing alone in the woods that bordered the cornfields of my grandfather's farm, his only fault being a reluctance to leave the glow of the light for the first hour. He has lived on in my mind, dead now more than 60 years, because dog men love to tell of the good ones as much as they love to watch them work.

There was Old Jerry, the farm dog, a cur, so loyal to my grandfather he walked every round behind the tractor Pa drove to plow the fields. "He wouldn't follow me, no," my father always says. "He only trailed Daddy." Jerry tolerated a goat harness and would pull a wagon or a snow sled hauling children to destinations unknown. Had he spent his days on the porch or under a shade tree he would be remembered as a lazy dog, and lazy don't count for much in my family. Instead, he was a working dog, the farm dog, and earned his place in our history by guarding ground that kept us fed and running off intruders who looked like they wasn't to be trusted.

I have been handed the right to call these dogs my own because I am the one who remembers them, the one who knows their stories, and I reckon, whether it is biology or brainwashing, I am the one who carried the love of working dogs into the next generation, who filled her house with dogs that do something, dogs that earn their keep, even if, like Kate, their working days were over before they came to sleep on my couch and love my boy.

I couldn't put this good girl in the ground, not when she so loved water and wings. They will send her up the smokestack this afternoon, and what they give back to me, the dust of her, belongs to two people.

A handful of Kate I will put in the garden of black-eyed Susans outside Walker's window, the one closest to his bed. The rest of her will ride with me to Grandfather Mountain where the wind is always blowin', blowin' hard.

I'll let her go, let the wind take her back to southern Illinois, back to Max Viklund in time for hunting season. Kate will fly there with the ducks, the ones who always before got away. ◆

Shari Smith lives in Claremont and is at work on her first novel.

WITH WHAT TIME REMAINS

Land conservation in North Carolina is more crucial than ever. Easements are an effective way for landowners to preserve valuable habitat and reap significant tax benefits.

Written by William H. Funk
Photo illustrations by Richard Paschal

The varied and vibrant landscapes of North Carolina are currently facing their greatest existential threat since the massive ecological changes wrought by European settlement. Within recent memory the Old North State was largely an agricultural domain, heavily forested on its Appalachian western flank, with highly productive farmland in the Piedmont and Coastal Plain and some of the most pristine beaches on the Atlantic coast. I can personally recall as a child in the 1970s climbing the dunes of Nags Head on summer mornings. Looking both south and north until the sea mist closed over the far distance, I would count maybe four dozen people, total. And this was in July and August.

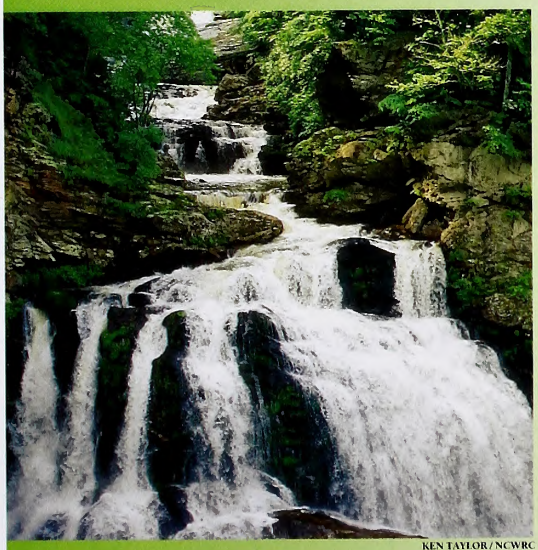
In an astoundingly short time the Outer Banks has been turned into a built-out, year-round imitation of the Jersey Shore. North Carolina is now a highly urbanized destination for hundreds of thousands of retirees and other transplants from Northern states and south of the Rio Grande, with howling interstates linking continuous beach condos to the exurban development spreading like fungal filaments out from Raleigh, then through the smoggy commercial strip along Interstate 40 west of Durham and into the rapidly urbanizing mountains.

The state's elected officialdom cheers this radical change as good for the economy, and for sure there must be a lot of people making a lot of money. But epidemic development in and of itself—with the massive increases in population and destruction of the natural world it necessarily instigates—cannot be allowed to dictate our patterns of land use. A more thoughtful, long-term and sustainable development must become the equal partner of programs that vigorously preserve the natural and rural landscapes that give North Carolina its irreplaceable character.

Of paramount concern is the ongoing destruction of farmland and wildlife habitat. According to the state Department of Environment and Natural Resources (DENR), "By 2030, North Carolina's population is expected to increase 50 percent to more than 12 million. Currently, North Carolina leads the United States in lost farm and forest lands—more than one million acres in 10 years. At least 383 acres per day are converted to new roads, shopping malls and housing developments." DENR notes that the acreage of open space permanently lost to development since 2003 is as if the state had lost an entire county every four years. This is much more than a temporary issue like the current economic roller coaster or the latest political tomfoolery. If we wish to retain our heritage of undeveloped open spaces, we must immediately accelerate our pace of land preservation.

LAWRENCE S. EARLEY/NCWRC

KEN TAYLOR/NCWRC



KEN TAYLOR/NCWRC

OPENING THE TOOLBOX

Fortunately there are ample tools at hand, and the most successful and trusted means of protecting privately owned property is through the donation of a conservation easement. Landowners who choose to place conservation easements on their property voluntarily and permanently relinquish the right to develop their land intensively, instead donating this right to an easement holder, typically a nonprofit land trust or a state agency. This donation provides a benefit to the general public by protecting specified conservation values found on the land, which might include agriculture, forestry, wildlife habitat or scenic or historic significance, as well as acreage contributing to a riparian buffer zone along a stream, creek or river. Conservation easements are legally binding on all future landowners and protect the land in perpetuity while allowing the landowner to retain the rights of private ownership and traditional land uses such as hunting and farming.

MELISSA McGAW / NCWRC

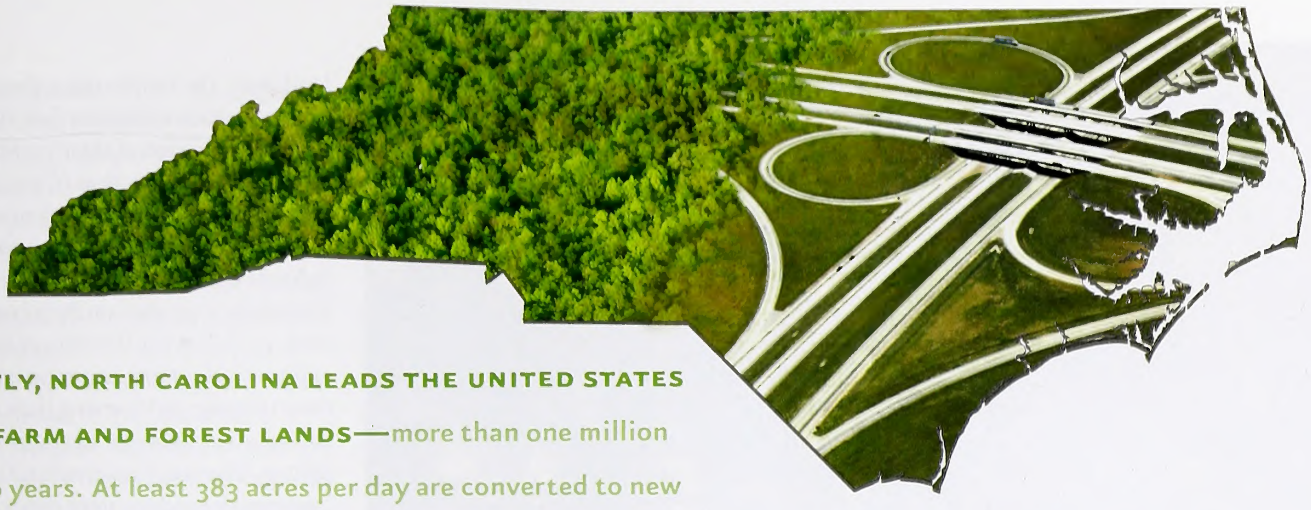
TODD PUSSER

JODY DUGGINS / NCWRC

As well as being donated by conscientious landowners, easements on properties with exceptional conservation importance are sometimes purchased through public bodies such as the Clean Water Management Trust Fund (CWMTF), which since 1996 has invested more than $506.3 million to help local governments, state agencies and land trusts acquire both conservation easements and land purchases to protect riparian buffers, floodplains and wetlands. CWMTF has leveraged an additional $1.4 billion in private and public funds to protect more than 454,944 acres of open space and 4,859 miles of riparian buffers.

The first step in donating a conservation easement is identifying the land's conservation values, followed by the careful drafting of a deed that specifically protects those values. Title and all other property rights remain with the landowner, as does the right to use the land in any way that doesn't harm the conservation values identified in the deed of easement. The donor may sell, bequeath or lease his property as usual. Public access is not necessary, nor does donating an easement "lock up" real estate or somehow render it unprofitable. Sustainable uses such as farming may continue indefinitely, and land under easement appreciates like all other real estate.

But make no mistake: Conservation easements are for those who love their land and want to retain what makes it special. Though there are generous tax incentives involved with easement donation, for owners whose chief concern is their financial bottom line, it will always be more profitable to destroy their land's unique features through development than to preserve those values in perpetuity. By deciding to renounce their legal right to turn their farms into suburbs, easement donors are making an indisputable financial sacrifice, one worthy of compensation. Easement donation protects wildlife habitat, forests and farmland for the use and enjoyment of future generations and is therefore



CURRENTLY, NORTH CAROLINA LEADS THE UNITED STATES IN LOST FARM AND FOREST LANDS—more than one million acres in 10 years. At least 383 acres per day are converted to new roads, shopping malls and housing developments

regarded by both federal and state governments as providing a public benefit worthy of economic rewards to help offset the expense of professional counsel and a reduced property value.

YOU CAN GO HOME AGAIN

Let's see how it all works with a fictional example of an easement donation. Thomas and Julia Wolfe have a 200-acre farm in southern Person County east of Hurdle Mills. The farm has been in the Wolfe family for generations and over time has been much reduced from its original size. The Wolfes raise corn, beans and organic beef cattle, and their property contains a small hardwood forest that is selectively logged for timber and is home to deer, turkeys, migrating songbirds and other native wildlife. Thomas is an enthusiastic hunter and has worked with the N.C. Wildlife Resources Commission to create food plots and vegetated fencerows to encourage the local quail population. Livestock has been fenced out of the spring-fed stream that flows through the farm, which is visible from a state highway and provides the driving public with agreeable pastoral views. The Wolfe family depends largely on their farm for income and has thus far refused the steady drumbeat of offers to buy made by land speculators eager to capitalize on the urban sprawl creeping north from Raleigh. The Wolfe property was recently appraised at $1,000,000.

One day the Wolfes hear about the advantages of donating a conservation easement on their farm and approach a local land trust, which informs them that their property has significant conservation values: farmland and forestland, wildlife habitat, water resources, and scenic assets. Working closely with the

EASEMENT CALCULATOR

North Carolina Conservation & Tax Credit Example

$1,000,000 = land value pre-easement
$600,000 = land value post-easement (reduced due to development restrictions)
$400,000 = easement value
$100,000 = state income tax credit (25% of easement value)

Federal Income Tax Deduction Example

Donor's easement value = $400,000

Donor's adjusted gross income (AGI) in 2008 = $100,000
$50,000 is deductible in 2009 (50 percent of 2008 AGI)

Donor's AGI in 2009 = $200,000
$100,000 is deductible in 2010 (50 percent of 2009 AGI)

Donor's AGI in 2010 = $300,000
$150,000 is deductible in 2011 (50 percent of 2010 AGI)

Donor's AGI in 2011 = $400,000
Just $100,000 is deductible in 2012 because donor has reached his $400,000 easement value

JODY DUGGINS/NCWRC

KEN TAYLOR/NCWRC

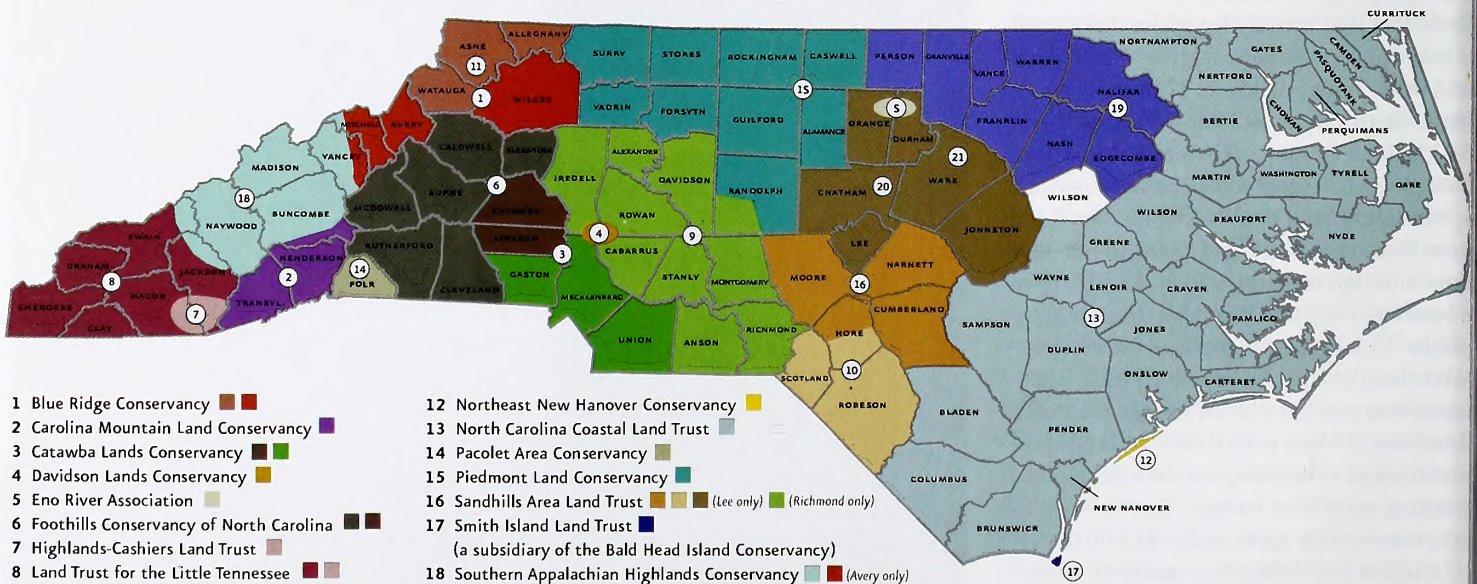
KEN TAYLOR/NCWRC

land trust, the Wolfes place their farm under a conservation easement that allows for the limited expansion of their current home and the future construction of a guest cottage nearby, but no further residential construction (although future barns and other agricultural buildings are fine). The easement, consistent with the county's comprehensive plan, prohibits the division of the property and precludes most commercial uses other than farming and forestry, thus preserving its conservation values for the future. Hunting, fishing, farming, horseback riding and other customary outdoor uses may continue unchanged, as will the Wolfes' ability to continue making a living from their farm.

North Carolina landowners who donate a qualifying conservation easement as a charitable gift for public benefit can generally claim federal income tax deductions and state income tax credits. In addition, the donation of a conservation easement removes the value attributable to the easement from the donor's estate for inheritance tax purposes, and the lowered property value typically results in a lower property tax assessment.

The federal charitable income tax deduction, usually equal to the value of the easement (a property's pre-easement value minus

NORTH CAROLINA LAND TRUSTS



1 Blue Ridge Conservancy
2 Carolina Mountain Land Conservancy
3 Catawba Lands Conservancy
4 Davidson Lands Conservancy
5 Eno River Association
6 Foothills Conservancy of North Carolina
7 Highlands-Cashiers Land Trust
8 Land Trust for the Little Tennessee
9 LandTrust for Central North Carolina
10 Lumber River Conservancy *(Columbus only)*
11 National Committee for the New River
12 Northeast New Hanover Conservancy
13 North Carolina Coastal Land Trust
14 Pacolet Area Conservancy
15 Piedmont Land Conservancy
16 Sandhills Area Land Trust *(Lee only)* *(Richmond only)*
17 Smith Island Land Trust
(a subsidiary of the Bald Head Island Conservancy)
18 Southern Appalachian Highlands Conservancy *(Avery only)*
19 Tar River Land Conservancy
20 Triangle Greenways Council
21 Triangle Land Conservancy

Source: Conservation Trust for North Carolina

MAP BY KRISTIE RHODES

STATEWIDE

Black Family Land Trust
Conservation Trust for North Carolina
North Carolina Rail-Trails

If no land trust covers your county, or if you are unsure what organization would meet your needs, please contact the Conservation Trust for North Carolina at www.ctnc.org, (919) 828-4199 or info@ctnc.org.

ts post-easement value equals its easement alue), can be used to reduce the donor's tax bligation by up to 50 percent of adjusted ross income (AGI) per year for 16 years or ntil the amount of the easement value is used p. Taxpayers making 50 percent or more of heir income from farming or forestry during he year of donation can reduce their AGI by p to 100 percent.

Since 1983, the state's Conservation and ax Credit Program (CTC) has offered andowners a credit on their state income tax worth 25 percent of their easement value up o $250,000 for individuals and $500,000 or corporations. The credit may be carried ver for five years after certification and has hus far aided in the preservation of 188,000 cres of open space.

Easement value is normally determined by he "before-and-after" method utilized by a eal estate appraiser specifically trained in the ppraisal of conservation easements. As with heir attorney and accountant, potential ease-ment donors must make every effort to engage n individual that has the experience and ducation necessary for work in the field of onservation easements, which involves umerous legal and tax complexities asso-iated with state and federal regulations. Local and trusts can make an important contribu-ion by recommending proven professional dvisors to landowners.

NVITATION TO SPRAWL

Let's take another look at our hypothetical easement donors, the Wolfes. Because their conservation easement prohibited intensive subdivision and development, the Wolfe farm's post-easement appraisal value was $600,000, a 40 percent drop from its pre-easement value of $1,000,000. The difference of $400,000 is the Wolfes' easement value, 25 percent ($100,000) of which can be credited toward their state income tax under the CTC program. See the "Easement Calculator" sidebar on page 23 for an example.

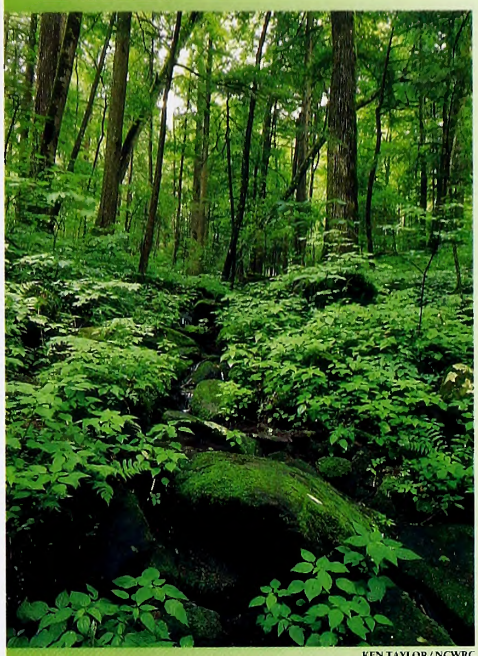
Unfortunately for the Wolfes and other North Carolina landowners—most particularly the average "land rich and cash poor" farmer—the state does not yet allow its tax credit to be transferable. In Virginia, the state tax credit can be used to offset an easement donor's state income tax liability dollar-for-dollar (though Virginia credits are 40 percent rather than 25 percent of easement value), except that any unused credit can be sold for cash to other Virginia taxpayers. For landowners without a sizeable tax burden, the ability to sell unused state income tax credit to other taxpayers (usually wealthy individuals or corporations) has been tremendously successful in preserving farms, forests and the rural lands upon which many of us rely for hunting access.

Chuck Roe, Southeast program director for the Land Trust Alliance and a veteran North Carolina land conservationist, sees a "synchrony of circumstances" that has contributed to our state's becoming—seemingly overnight—the most heavily developed Southern state next to Florida. "North Carolina has a large and expanding population with a lot of big, medium-sized and smaller cities," says Roe. "This provides for a great deal of urban/rural interface and resulting sprawl development leaching out into farmland and forests." If there is any benefit to these multiple instances of urban/suburban sprawl, says Roe, it is that having urban areas scattered across all regions of the state contributes to a stable membership base for the 25 local and regional land trusts that together hold easements on 150,000 acres of signature open space and have purchased or otherwise helped acquire another 150,000 acres.

The splendid open spaces of North Carolina are under mortal siege, plain and simple. From the muddied mountain streams to the vanishing Piedmont farms and overdeveloped Outer Banks, the state's matchless land legacy is buckling from the strains of uncontrolled development. Rural landowners hoping to keep their farms, forests or hunting preserves intact for future generations must keep this in mind: Whatever open space is not granted permanent protection will eventually be lost to development. It is inevitable. The only certain way to truly safeguard the land you love is by protecting it with a conservation easement, a legal guarantee that your crops and cattle, your barns, hardwood stands and wildlife food plots will persist when you are no longer here to protect them.

Think about the inheritance you want to leave your children and their children. Recall what your own childhood amid the sights and sounds of the natural world meant to you, and make your decision accordingly. ◆

A former resident of Raleigh, William H. Funk writes articles on natural history and conservation issues. He lives in Virginia's Shenandoah Valley and may be reached at williamfunk3@verizon.net.



KEN TAYLOR/NCWRC

KEN TAYLOR/NCWRC

TODD PUSSER

Rural landowners hoping to keep their farms, forests or hunting preserves intact for future generations must keep this in mind:

WHATEVER OPEN SPACE IS NOT GRANTED PERMANENT PROTECTION WILL EVENTUALLY BE LOST TO DEVELOPMENT.

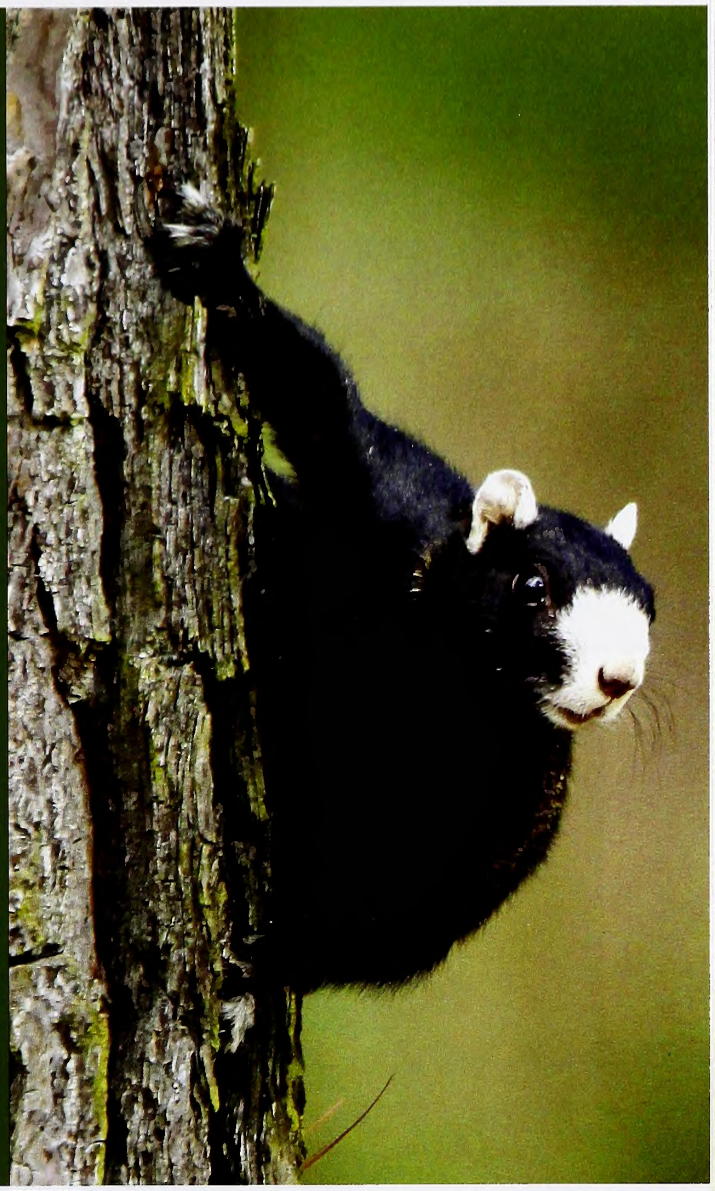
HUNTING THE NORTH CAROLINA SQUIRREL SLAM

BILL LEA

THE PURSUIT OF GRAY, FOX AND RED SQUIRRELS CAN TAKE A HUNTER ACROSS THE STATE OR SOMETIMES ONLY TO A SINGLE COUNTY.

Written by Mike Marsh

BILL LEA



TODD PUSSER

North Carolina is home to three squirrel species (from left): red, gray and fox.

THE NOTION OF A SLAM, the taking of everything possible, originated in card games, but the term has become frequently used in such sports as baseball, tennis and golf. Hunting and fishing also have their slams. Turkey hunters can take a slam of all the species. Big-game hunters have their own slams of animals taken in North America, Africa or a defined combination anywhere else in the world. Anglers have billfish slams, among others.

So, as I considered a renewed interest in small-game hunting, because of new firearms and cartridges, along with the extension of the state's gray and red squirrel season (Oct. 18–Feb. 28), I pondered prospects for taking North Carolina's squirrel slam in a single season. Tweaking dates for gray and red squirrels to provide a longer hunting season for them had always intrigued me, and I had strongly supported the N.C. Wildlife Resources Commission's goals of extending the season into February to inspire adult hunters to take their kids hunting, as well as having more fun themselves.

Introduction of the .17-caliber Hornady magnum rimfire (HMR), a round with a bottleneck case that is incredibly accurate and flat shooting enough to take squirrels at 100 yards, was an inspiration. But thoughts of having taken a slam of every species of game bird and game animal in the state left me without a check mark beside the red squirrel, or boomer. Sure, I had seen boomers over the years. But I had never actually hunted or taken a red squirrel.

I met Bob Glenn and his son, David, during a coastal bear hunt. It's ironic that planting the seed of a hunt for the state's smallest game mammal occurred during a happenstance meeting during a hunt for the state's biggest game mammal. Bear hunters like the Glenns travel statewide to take advantage of varying hunting season dates. I snapped a few images of David and Bob with their nice Tyrrell County bear and asked them about red squirrels when I learned they were from Black Mountain. "Sure, we have red squirrels," Bob Glenn said. "On a good day, they're everywhere, like flies."

I wrangled an invitation to hunt with Bob at the Mount Mitchell Bear Club, setting in motion a cross-state odyssey. I had stepped on a pruning saw and cut my right Achilles tendon and had also torn three of the four ligaments in my right rotator cuff while digging some postholes. The injuries put me on the sidelines, limiting my hunting and fishing for nearly a year. As I suffered through days of recovery, thoughts of hunting at Mount Mitchell gave me inspiration.

Bob and I kept in touch. I sent him some images of himself and his son with Ruger, their Plott hound, and their Gull Rock Game Land black bear. For his part, Bob promised to take me on a red squirrel hunt. It was one of the goals that kept me focused during the months of physical therapy it took to get my body back in shape. I often thought of taking a fox squirrel in a longleaf forest at a near-sea-level elevation in the Coastal Plain, a gray squirrel almost anywhere and a red squirrel at one of the state's highest elevations.

The .17 HMR had earned a reputation for incredible accuracy over the five years since its introduction. Taking the first leg of the squirrel slam — a fox squirrel in its native habitat — with a new rifle was intriguing. I bought a Mossberg 817, fitted it with a 3x9 Simmons rimfire scope with an adjustable objective lens and sighted it in. The rifle-and-scope combo was superbly accurate, grouping bullets at 50 yards into one tiny ragged hole. It was more than accurate enough for hunting the state's largest squirrel.

The Coastal Plain is riddled with patches of excellent fox squirrel habitat, many of them occurring on commission game lands. I chose Bladen Lakes Game Land because it was near my home in Wilmington and I had seen fox squirrels there during deer hunts.

I knew from sitting in deer stands and observing the intriguing critters scampering about that seeing one every two or three days was possible, and getting a shot at one could take more than one sighting. Fox squirrels would rather run along the ground than climb a tree to escape a predator. But once in a tree, they are not nearly as high strung as gray squirrels, often stopping on a low limb as if

Fox squirrels, the largest of three species, are often found in the longleaf pine forests of the Coastal Plain.

TODD PUSSER

secure in the knowledge that whatever is pursuing them can't climb. It's their undoing if a hunter wants to take a fox squirrel and is aligning the sights.

It was with great joy that I walked with only a slight limp, initiating an almost inaudible scuffing on a thick carpet of longleaf needles. Scouting for fox squirrels is relatively easy and quiet when a sandy subfloor underlies the pine needles and turkey oak leaves of a savanna that has been cleared of underbrush regularly with prescribed burns.

Fox squirrel tracks across a sandy trail told me I was in the right place. Then I spied a huge leaf nest in a small bay pocket between the pine ridges that was too low and wet to burn. A fox squirrel nest is typically much larger than that of a gray squirrel. But the nests are widely spaced in their habitat because of low population densities. Finding the nest was a good omen. Some gnawed mushrooms, dug from beneath the pine straw, were a promising sign. Then I found what I was really looking for, the remains of several longleaf pine cones piled high at the base of a tree. A fox squirrel had chewed through the cones, one scale at a time, eating the seeds between them and leaving the pile of scales along with denuded cone cores.

Setting up a folding stool where I could see a long distance along the ground, as well as watch the leaf nest, I began my vigil at about 1 p.m. Fox squirrels are lazier than gray squirrels. They typically feed later in the morning and then rest during the middle of the day, soaking up sunlight on a tree limb. In mid-afternoon they forage again before heading to the nest well before sundown.

I was almost lulled into napping by the solitude when a fox squirrel appeared. He scurried, hesitated and then jumped onto a longleaf trunk, his claws scraping on the bark. When he scampered down the opposite side of the tree, I raised the rifle. He reemerged and stood erect to look around for danger. My heart was pounding. Although the game was small, the big adrenaline rush translated into crosshair shake.

At the shot, the squirrel ran into the bay. I saw him again as he ran into his leaf nest in a large red bay tree and heard him curse me in deep fox squirrel barks and chirrs. Dejected at missing, I discovered that a 17-grain .17 HMR bullet explodes on impact with the slightest object when I found places where bullet fragments struck the sand after hitting the needles of a grass-stage longleaf before reaching the squirrel.

F. EUGENE HESTER

MIKE MARSH

MIKE MARSH

Gray squirrels are the most common in the state, and are usually pursued with .22 rifles or 410-gauge shotguns.

But now I knew for certain where the fox squirrel lived. Bladen Lakes is a three-day-per-week game land. I waited out a day then returned to continue my hunt. At mid-afternoon, even my gunfire-deafened ears could hear longleaf cone scales striking the pine straw. Up in a tree, away from his nest, the fox squirrel was munching away.

It took some maneuvering to get a clear shot, with nothing between rifle and squirrel but air. At the shot, the squirrel dropped to the pine needles. I admired his Carolina-classic coloration: black head, gray body, white nose and white feet. My nostrils flared

BILL LEA

MIKE DUNN

MIKE MARSH

Red squirrels, at home in the mountains, are the smallest of the species and can be detected by the remains of hemlock cones they have eaten.

at the aroma of his fur mingled with the scent of shredded longleaf cones and pine sap, overripe turkey oak leaves and tendrils of rimfire rifle smoke wafting from the gun barrel. The first leg of my slam was completed.

Our family hunting land in Pender County has lots of gray squirrels. Huge oaks and hickories are complemented with loblolly and pond pines to create perfect gray squirrel habitat. Throughout the year, gray squirrels also dine on cypress cones, maple seeds, sweet gum buds and black gum berries, which keeps their numbers plentiful and well nourished.

I carried the new rifle into a mixed stand of hardwoods and pines, scanning the canopy for leaf nests and the forest floor for diggings and gnawed acorn husks and hickory nutshells. It didn't take long to find copious quantities of gray squirrel sign and to begin a silent stalk. Slipping along, I saw a couple of squirrels — but after they saw me. One made it to a leaf nest; the other departed swiftly, bouncing from tree limb to tree limb until he disappeared in the evergreen camouflage of a stand of laurel oaks.

As I was watching intently for him to reappear, I heard something scratching the bark of an oak behind me. A gray squirrel had watched me walk past. In classic gray squirrel style, now that the coast looked clear, he moved to a horizontal limb to assess the situation. With tail arched over his back, he scratched his ear with a hind leg. Once he was finished, he presented a classic shot. At the crack of the rifle, he fell into a thicket below.

I worked my way through a greenbrier tangle, rendering the proverbial pound of flesh to get to the squirrel. I picked him up from a bed of oak leaves and loblolly needles. A wood duck hen squealed in the nearby swamp, and several gray squirrels began their chattering alarm communications in response to the shrill cries of a red-tailed hawk. To the accompaniment of the natural fanfare, I walked back to my truck with the lump in my game vest as evidence I had completed the second leg of a squirrel slam.

My son, Justin, had been a nuclear field petty officer in the U.S. Navy. After his six-year enlistment, he had become a student at UNC Charlotte. Being eight decks down inside an aircraft carrier in the Persian Gulf War gives a young man time to reflect. Some hunters would laugh off an invitation to hunt boomers, but not he. "When I was on the ship, all I could think about were the days I spent hunting and fishing with you, Dad," he said. "Those have been the happiest times of my life. Now it's all I want to do. Sure, I would love to go on a red squirrel hunt." Justin's schedule at Lee College of Engineering was extremely compressed. Yet we eventually coordinated, making arrangements to meet Bob in Black Mountain.

As we ate breakfast at a local restaurant, Bob said the weather wasn't very good for red squirrels. "They like sunny days best," he said. "When it's warm, they run all over the place. We have some old trailers, and there's a cabin on the bear club. They run on top of the roofs, and they are almost nuisances."

But today was foggy, rainy and cold, threatening sleet and freezing rain. I had hoped to photograph the gorgeous mountain terrain, with the leaves turning colors under a golden, slanting morning sun. All we saw was a dripping morass of wetness on the bone-jarring drive along an old narrow-gauge railroad bed that once transported saw logs and now made a hunting and hiking trail.

Our heads bounced like bobble-head dolls as the short-wheelbase jeep lurched slowly up the trail, over one rock with the front wheel while simultaneously bouncing down from another rock with the opposite side's rear wheel. We passed the Mount Mitchell Bear Club's camp, a group of timeworn trailers complemented with weathered outdoor tables and chairs.

Bob pulled his jeep over at one of the few places where his fellow hunters could pass. A bear hunt was in progress, and Bob kept pace of the hunters and hounds with a CB

radio as Justin and I stepped into the weather and pulled on raingear.

We looked across the vastness of the mountains enveloped in fog. Misty rain congealed, dripping steadily from the mountain laurel, pines, firs and oaks. Bob emerged from the jeep, and we talked about bear hunting in bad weather, when suddenly a red squirrel scampered across a boulder and jumped behind a pine trunk. "What are you doing standing around without your gun?" Bob asked. "We aren't just sightseeing; we're hunting!"

Bob told us to walk the mile-long trail the way we had come, with each hunter covering the woods on his side.

My Achilles tendon was tender-tested as I carried a Stevens 311 double-barrel .410-bore shotgun stoked with 3-inch loads of No. 6 shot up and down the hills and hollows. I had bought the classic squirrel gun on my 18th birthday, 38 years before. When hunting squirrels, nostalgic guns and new firearms alike can play key roles. This one was lightweight and easy on a mending shoulder.

Justin carried a family heirloom, a Remington 1894 double-barrel his great-great-grandfather had received for clearing a field with hand tools and a mule team. It was also loaded with No. 6 shot. "There he is," Justin said. "He's on your side."

He turned out to be a she. The .410 barked, and I carefully walked to where she had fallen. After a few minutes of searching, I spotted her perfectly camouflaged fur, reddish orange against the fallen leaves, crabapples and gnawed hemlock seeds. Her wet fur's warmth penetrated my acrylic gloves when I picked her up and stroked the moisture from her tail.

Justin fired at another red squirrel, but it disappeared into a ground burrow. "These squirrels live four-dimensional lives," he said. "They live above the ground like other squirrels, but they also have holes in the ground like chipmunks. Of all the squirrels, these must be the most challenging to hunt."

Once Justin learned to identify the vocalizations of red squirrels, which sound more birdlike than mammalian, he heard them across the landscape. But the weather took a turn for the worse. Bob drove up, and we climbed into the jeep. The bottom fell out of the sky just as I spied a red squirrel hopping a limb. Climbing back out, I reloaded the .410 and took the adult male.

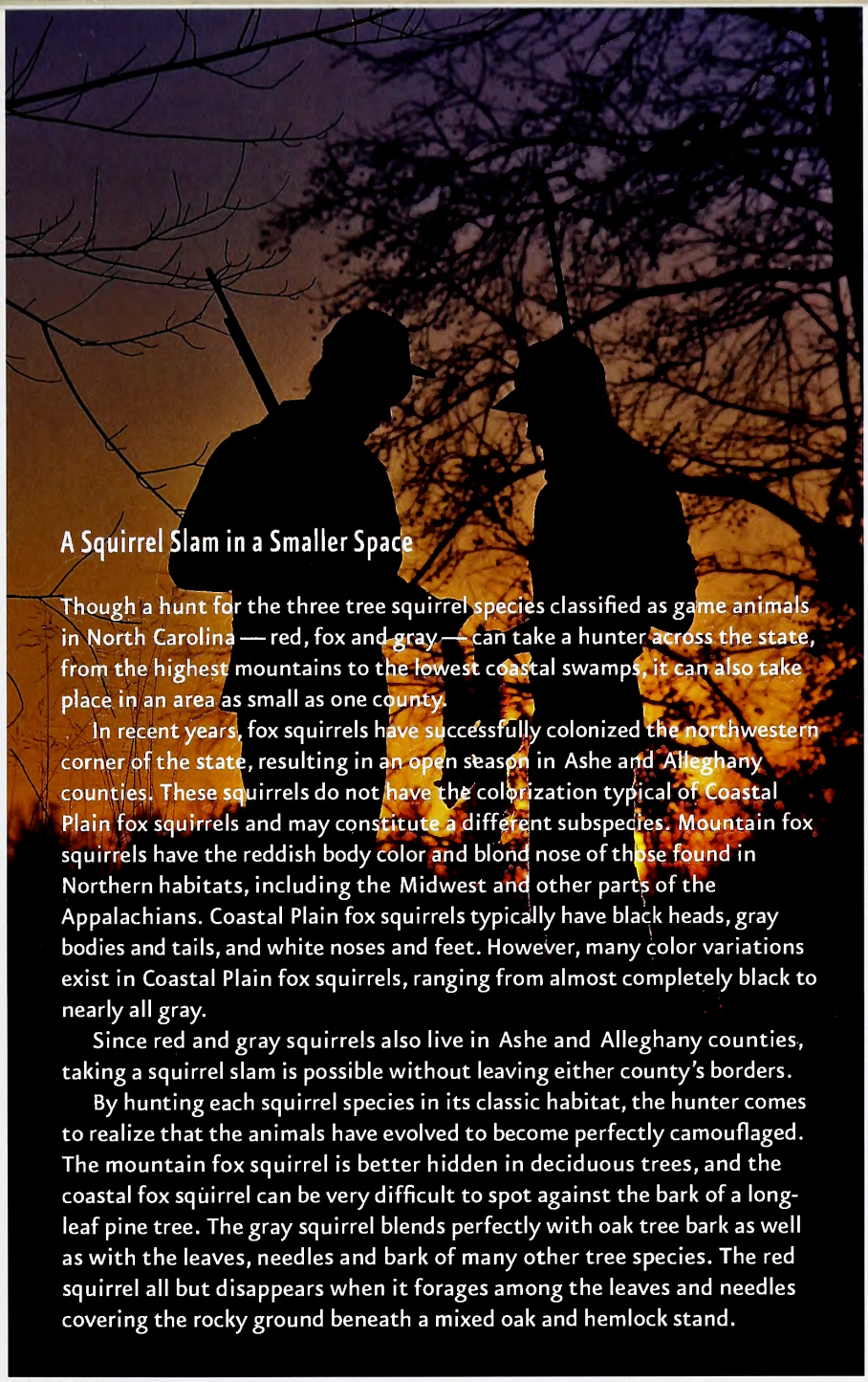
"He's a big boomer and might weigh half a pound, but I doubt it," Bob said. "People don't hunt boomers much anymore. They would rather shoot gray squirrels because they're bigger. But I like to eat boomers. I hunt them with a scoped .22 rifle."

On the way back down the mountain, we saw a few more red squirrels run across the rugged road. But they were safe until a future hunt. Bob dropped us off, promising to take us back up the mountain for a rematch. Justin had yet to take either a red squirrel or a fox squirrel.

"Hunting for a squirrel slam proves you don't have to hunt big game to have a big adventure," Justin said. "I've seen some of the most gorgeous country in the state, maybe even the world. Hey, look, the clouds are opening up."

Indeed, for one perfect instant as we were driving homeward through Black Mountain, a hole in the fog gave us the picture-perfect grandeur I had really wanted Justin to see. After all, a red squirrel hunt, like any hunt, is also an excuse to see the country that is the quarry's home and part of its very essence. The hunt is a much deeper personal experience than any postcard photo will ever be able capture. ◆

Wilmington writer Mike Marsh is a regular contributor to Wildlife in North Carolina.



F. EUGENE HESTER

A Squirrel Slam in a Smaller Space

Though a hunt for the three tree squirrel species classified as game animals in North Carolina — red, fox and gray — can take a hunter across the state, from the highest mountains to the lowest coastal swamps, it can also take place in an area as small as one county.

In recent years, fox squirrels have successfully colonized the northwestern corner of the state, resulting in an open season in Ashe and Alleghany counties. These squirrels do not have the colorization typical of Coastal Plain fox squirrels and may constitute a different subspecies. Mountain fox squirrels have the reddish body color and blond nose of those found in Northern habitats, including the Midwest and other parts of the Appalachians. Coastal Plain fox squirrels typically have black heads, gray bodies and tails, and white noses and feet. However, many color variations exist in Coastal Plain fox squirrels, ranging from almost completely black to nearly all gray.

Since red and gray squirrels also live in Ashe and Alleghany counties, taking a squirrel slam is possible without leaving either county's borders.

By hunting each squirrel species in its classic habitat, the hunter comes to realize that the animals have evolved to become perfectly camouflaged. The mountain fox squirrel is better hidden in deciduous trees, and the coastal fox squirrel can be very difficult to spot against the bark of a long-leaf pine tree. The gray squirrel blends perfectly with oak tree bark as well as with the leaves, needles and bark of many other tree species. The red squirrel all but disappears when it forages among the leaves and needles covering the rocky ground beneath a mixed oak and hemlock stand.

Our Beautiful Birches

written by Terry Krautwurst / illustrations and nature activity by Anne M. Runyon

YELLOW BIRCH CATKINS

As dawn breaks over the Blue Ridge, a Carolina Northern flying squirrel climbs into its high tree-cavity home and snuggles into a warm, fluffy nest of shredded yellow birch bark. In a mountain cove, hungry ruffed grouse pluck at the nourishing buds of sweet birch trees. Near a Piedmont stream, a band of dark-eyed juncos peck like chickens in a barnyard at the countless tiny winged seeds scattered by river birches. All across North Carolina, wherever they grow, birches benefit wildlife and add beauty to the landscape.

TREES FOR EVERY SEASON

In spring, before their leaves appear, birch trees are laden with male and female flower clusters called catkins. Long strands of tiny male flowers hang like tassels from the tips of branches, and short, stubby female catkins stick out along the branches' sides. Birches rely on the wind instead of insects to help pollinate their flowers. They have to release a lot of pollen in a short time, before the leaves unfurl and block the pollen-filled wind.

In summer, the long limber boughs of birch trees sway gracefully in the breeze, their green saw-toothed leaves rustling, the lighter undersides flickering like butterfly wings. If you look closely, you might see new, unopened catkins on the branches—next spring's flower clusters. Meanwhile, the current year's pollinated female catkins form short green cones called strobiles. When the cones ripen, they turn brown and disintegrate, releasing the tiny seeds inside.

In autumn, birch leaves lose their green chlorophyll and reveal their true color: vivid yellow. The pigments that give birch leaves their spectacular fall color are xanthophylls, the same colorants that put the yellow in egg yolks and goldfinch feathers. Fall is also the time when most birch species scatter their seeds to the wind.

Even winter can't cool the beauty of birches. Their branches are studded with new buds and catkins waiting for spring. And without their leaves to distract you, the trees' distinctive bark stands out. When you think of a birch tree, you might think of the white birch bark that American Indians used to make canoes. But not all birch trees have white bark. Each of North Carolina's four native birch trees has its own kind of bark, and its own special qualities.

Green comma caterpillar on a yellow birch leaf.

WILD NOTEBOOK

Winter catkins of a sweet birch.

HEART-LEAVED BIRCH

Sweet birch wood contains wintergreen oil, which is used to flavor candies and medicines. Today wintergreen oil is made chemically, but in the past the bark and wood of sweet birch trees were the main source. Sweet birch sap can be tapped and made into syrup, too. In colonial days, it was fermented to make birch beer.

MOUNTAIN GOLD

Yellow birch trees grow high in our mountains, up to 5,000 feet, and on northern slopes and cold, rocky places in coves above 3,000 feet. The yellow birch's leaves resemble the sweet birch's, and so does its similar, but fainter, wintergreen aroma. There's no confusing the two, though, because yellow birch has shiny, silvery-golden bark that curls up in papery layers.

Sometimes soaring as tall as 80 feet, yellow birches are the largest of our four native birches. Strong, supple limbs and waterproof bark protect them from harsh, windy mountain weather. Even yellow birch seedlings are tough. Often they sprout and grow on moss-covered boulders or rotting "nurse" logs. As the tree grows, its roots wrap over the rock or log and push down into the soil. When a nurse log eventually decays and crumbles away, the yellow birch is left standing on "stilts"—its long roots.

YELLOW BIRCH

MOUNTAIN RARITY

In a few spots in Yancey County's Black Mountains, high on Mount Mitchell and other cold, rocky slopes, grows North Carolina's rarest birch tree: the mountain paper birch. With gray to white bark that peels in strips showing coppery undersides, the tree resembles its better-known Northern cousin, the white or canoe birch. But its bark isn't as white, and its leaves are large and shaped like hearts, giving this tree its other name: heart-leaved birch.

HOW SWEET IT IS

Like most of our state's birches, the sweet birch is mainly a Northern tree with one foot in the South—the cool North Carolina mountains. Sweet birches thrive on the slopes of partially sunny coves at elevations from 4,000 to about 2,000 feet, and sometimes lower on the western edges of the Piedmont.

Sweet birch is also called black birch, because of its smooth reddish-black bark, and cherry birch, because the bark's color and long sideways lines of pores, called lenticels, make it look similar to a cherry tree's bark. There's an easy way to tell a sweet birch from a black cherry, though: snap a twig and sniff it. If it's a sweet birch, the twig will smell like wintergreen.

A RIVER RUNS BY IT

Unlike our other native birches, the river birch is common across the entire state, from the western-most mountains to the coast. It's our only birch that grows at low elevations.

As you might guess from its name, this birch likes water. The trees thrive along sandbars, on coastal floodplains, and in the silty soil near slow-moving rivers and streams. Its long, limber boughs arc gracefully over the water, its rustling leaves providing cool summer shade to wildlife and fishermen. River birches release their seeds in summer rather than in fall like other birches, providing an early treat for songbirds.

The river birch's bark is smooth and reddish brown on small branches, but on the trunk and large limbs it peels back in gray papery curls that reveal a striking salmon-colored layer below.

RIVER BIRCH

Get Outside

Be a bark specialist. Birch trees aren't the only ones with interesting bark. Shagbark hickory has long, thick plates of bark. Striped maple's bark is green. Yellow locust bark has deep furrows. Persimmon tree bark looks like alligator skin. Once you start looking, you'll find that every kind of tree has a special bark. Make a bark field guide by taking photos of each kind you see.

Discover a birch's small wonders. Use a hand lens or pocket magnifier to take a *really* close look at birches. In spring, a blossoming birch catkin's hundreds of tiny flowers become big, beautiful blooms when magnified. In late summer and fall, birches release tiny winged seeds barely a tenth of an inch long. Under a hand lens, some kinds look like butterflies. Others look like jet planes.

Look and listen. There's more to identifying trees than learning each kind's leaf shapes and bud and twig arrangements. Look at the whole tree. Do you see how the leaves and branches of different kinds of trees move differently in the wind? Birch leaves rustle and sway. Yellow poplar leaves tremble on long stems. Other kinds bob up and down, or swing side to side. Now, listen. Wind blowing through pines whispers. Young beech tree leaves in winter rattle. What sounds do the trees in your backyard make?

Read and Find Out

- "The Illustrated Book of Trees" by William Carey Grimm, Stackpole Books, 2001.
- "Peterson First Guide to Trees" by George A. Petrides, Houghton Mifflin, 1998.
- "Tree Finder: A Manual for Identification of Trees by their Leaves" by May Theilgaard Watts, Wilderness Press, 1963.

In *Wildlife in North Carolina:*

- "What Do You See When You Look at a Tree?" by Carlton Burke, December 1998.

Find out more about Project WILD Workshops and literature at the Wildlife Commission's website at www.ncwildlife.org.

A single male birch catkin releases more than five million pollen grains.

Fold a Beautiful Birch and Hungry Animal Ornament

1) Copy activity onto heavy paper.

2) Cut out the rectangle.

3) Fold Birch Twigs & Catkins down behind Cottontail Rabbit.

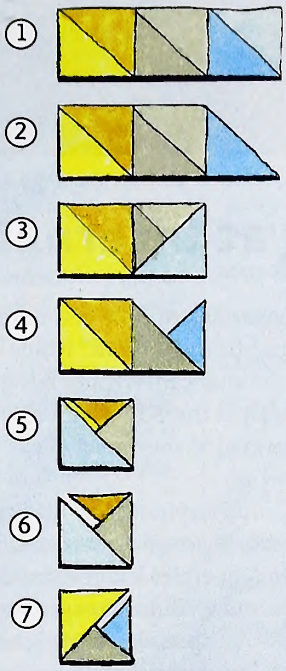
4) Fold Rabbit left across Birch Sap and Yellow-bellied Sapsucker.

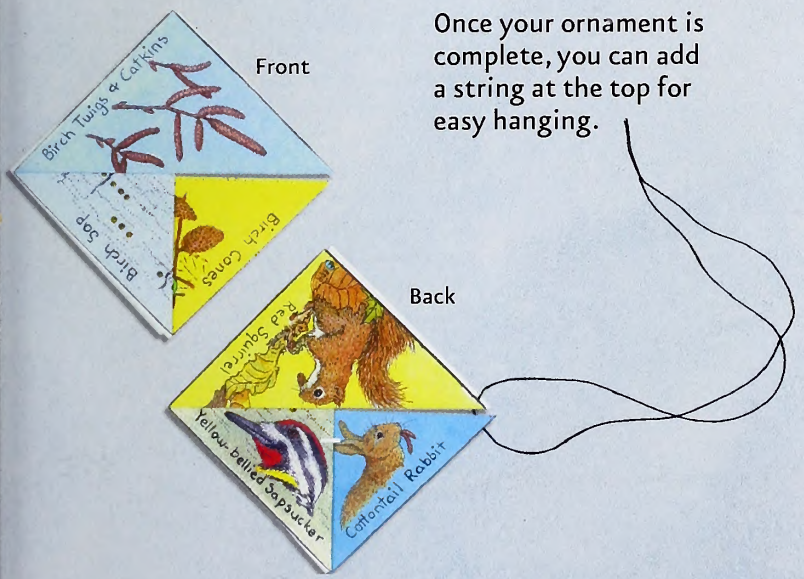
5) Fold Birch Twigs & Catkins and Birch Sap down behind Yellow-bellied Sapsucker.

6) Fold Yellow-bellied Sapsucker and Cottontail Rabbit left across Birch Cones and Red Squirrel.

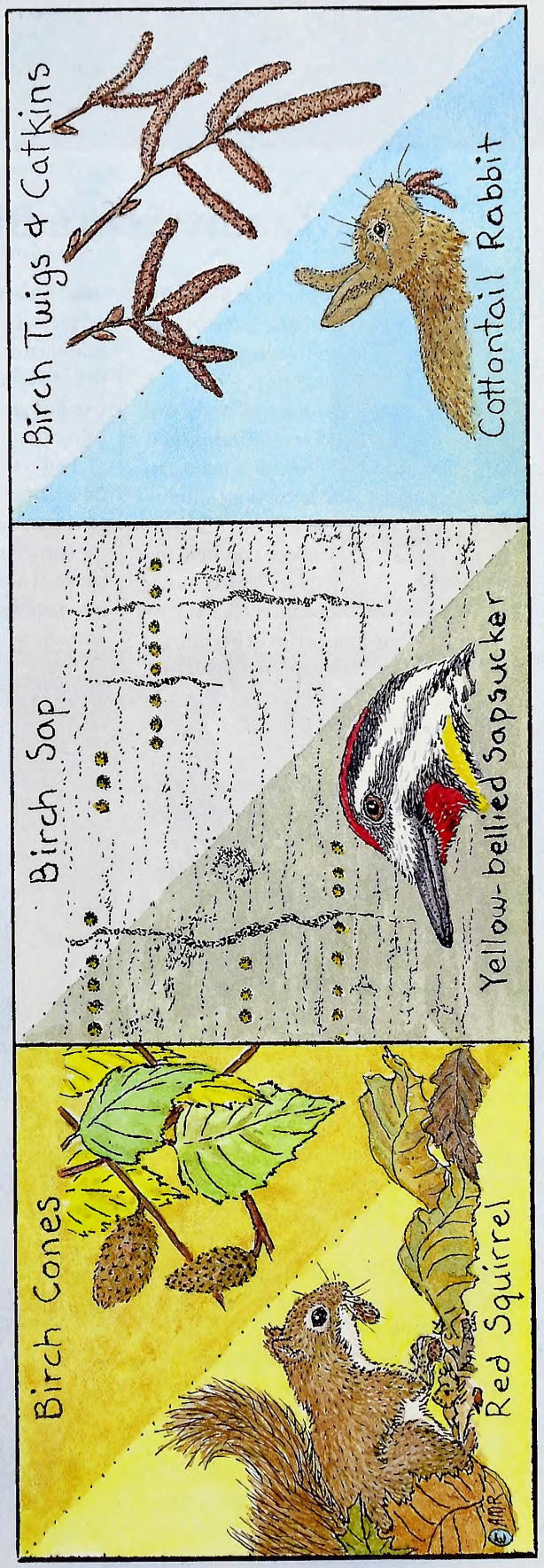
7) Now fold Red Squirrel behind Birch Cones.

8) Animals are on back side of the ornament.





Once your ornament is complete, you can add a string at the top for easy hanging.



TREES WE NEED

Many mammals rely on nut-bearing trees such as oaks for food. Birches provide different kinds of food for a variety of creatures. Deer and cottontail rabbits browse on the twigs. Ruffed grouse eat the buds and catkins. Red squirrels store the seed-filled cones for winter. Yellow-bellied sapsuckers and underwing moths sip the sap. Butterfly caterpillars munch the tender leaves. Songbirds of all sorts gobble the seeds. Birches give humans a kind of nourishment, too: beauty, in every season.

N.C. Teams Score Big at International Challenge

Participants and teams from North Carolina dominated the 25th annual International Youth Hunter Education Challenge in both the senior and junior categories.

Tar Heel competitors took first and third place in both junior and senior individual categories, first place in the junior team category and third place in the senior team category. The silver anniversary event, hosted by the National Rifle Association, was held in July at Mansfield University in Pennsylvania.

The Youth Hunter Education Challenge is a demanding week-long series of events, featuring shooting competition in .22-caliber rifle and muzzleloader at knock-down targets, shotgun on a sporting clays course and archery at three-dimensional game targets. A nonshooting component consists of orienteering, wildlife identification, a written hunter responsibility and ethics exam, and a hunter safety trail test.

"With results like this, it is easy to see why North Carolina is considered a powerhouse in youth shooting sports," said Travis Casper, assistant hunting safety coordinator with the N.C. Wildlife Resources Commission. "You have to acknowledge the hard work and dedication of the competitors, their families and coaches to get to this level of success. You also have to thank the schools and school systems that recognize the value of this activity and encourage participation."

Nearly 400 competitors, coaches and parents attended this year's event. Some 50,000 young people take part in youth hunter safety skills events across the United States and Canada annually.

Another notable performance from North Carolina was the South Davie junior team, which won first place in Junior Team Shotgun competition.

In North Carolina, teams and individuals compete in Youth Hunter Safety Skills Tournaments, a component of the Wildlife Commission's Hunter Education Program, with teams from elementary, middle and high schools, both public and private. Home-schooled students and teams representing organizations such as the 4-H or FFA also can compete, provided they meet eligibility requirements.

Hunter education is required for all first-time hunting license buyers in North Carolina. Courses cover hunter ethics and responsibility, conservation and wildlife management, survival and first aid, specialty hunting and tree-stand safety. For more information, visit www.ncwildlife.org or call (919) 707-0031.

PHOTO COURTESY OF NRA

PHOTO COURTESY OF NRA

Levi Epps (left, top photo) and Hunter Efird took the overall titles.

Junior Individual Overall Winners
1st Place: Hunter Efird
North Carolina Park Ridge Sharpshooters
2nd Place: Bryce Bason
Pennsylvania Junior Blue
3rd Place: Lea Efird
North Carolina Park Ridge Sharpshooters

Senior Individual Overall Winners
1st Place: Levi Epps
North Carolina
2nd Place: Jason LeVan
Pennsylvania Senior Gold
3rd Place: Billy Janos
North Carolina Forbush High School Red

Junior Team Overall Winners
1st Place: North Carolina Park Ridge Sharpshooters
2nd Place: Pennsylvania Junior Blue
3rd Place: Oregon Junior Team

Senior Team Overall Winners
1st Place: Pennsylvania Senior Gold
2nd Place: Pennsylvania Senior Blue
3rd Place: North Carolina Forbush High School Red

e NEWSLETTER
Get N.C. Wildlife Update—news including season dates, bag limits, legislative updates and more—delivered to your Inbox from the N.C. Wildlife Resources Commission. Sign up at www.ncwildlife.org/enews.

Top 10 Natural Wonders

Land for Tomorrow, a coalition dedicated to supporting the preservation of North Carolina's land and water resources, has announced the winners of the first-ever "North Carolina's Ten Natural Wonders Contest." The contest is part of Land for Tomorrow's effort to highlight past generations' conservation successes and urge North Carolina lawmakers to continue supporting conservation in our state. In fact, several of the nominations, including many of the Natural Wonders identified, were protected with the help of North Carolina's conservation trust funds.

Participants were encouraged to nominate any landscape, natural feature, wildlife or plant life that is unique to North Carolina and should be considered among the state's greatest natural wonders. About 1,300 nominations yielded 200 unique potential "Natural Wonders," which were narrowed to a field of 25 semifinalists by a panel of prominent North Carolinians. From those 25, "North Carolina's Ten Natural Wonders" were determined by popular vote. More than 3,000 individual votes were submitted.

"North Carolina has something to offer to nature lovers of every description, and the excitement this contest generated is proof of that. We had a great time reading everyone's arguments in favor of their favorite spots—each one is worthy of that affection, no matter how small or little-known," said Reid Wilson, executive director of the Conservation Trust for North Carolina. "People who live in North Carolina and those who love to visit are passionate about protecting their favorite places and—with their support—we'll continue to put that passion into action to safeguard these beloved natural wonders."

North Carolina's Ten Natural Wonders are:

BLUE RIDGE PARKWAY

CAPE HATTERAS ① AND CAPE LOOKOUT

GRANDFATHER MOUNTAIN

GREAT SMOKY MOUNTAINS

LAKE MATTAMUSKEET

LUMBER RIVER ②

MERCHANTS MILL POND STATE PARK

MOUNTAINS TO SEA TRAIL

NEW RIVER

OCRACOKE ISLAND

PHOTOS BY KEN TAYLOR/NCWRC

Commission Advises Avoiding Fox Conflicts

The N.C. Wildlife Resources Commission is reminding residents that foxes sighted in urban and suburban settings are not necessarily rabid or dangerous, and residents can take a few simple steps to avoid conflict with the animals.

MASLOWSKI WILDLIFE PRODUCTIONS

Simply seeing a fox is not a cause for alarm. Catching a glimpse of one can actually be a rewarding experience in that it provides an opportunity to witness one of North Carolina's most adaptable species. However, people still should not approach foxes or fox dens, even if the animals seem harmless.

In most cases, citizens that simply see a fox do not need to take any action. However, some action might be necessary in situations where foxes have become habituated to people. In those scenarios, people can and should take steps, such as yelling, banging pots and pans and setting off legal fireworks, to chase foxes from yards and neighborhoods. Be aggressive and repeat these actions if the foxes do not leave.

In order to prevent a situation where this type of action is needed:

- Don't feed wild animals—they can lose their fear of people.
- Make sure you are not indirectly feeding wildlife. Clean up pet food, secure trash in an animal-proof container, keep barbecue grills clean and remove bird feeders.
- Establish protective barriers to keep wildlife from entering basements, crawl spaces, attics and beneath decks, where they might build nests or dens.
- Secure pets or keep them indoors. Dogs can disturb dens, prompting aggressive behavior from the foxes.
- Clear overhanging tree limbs or other means of access that wildlife can use to enter a structure.
- Clear fallen fruit from around trees.
- Encourage neighbors to follow these methods.

If the above solutions fail to remedy the problem, contact the commission at (919) 707-0010. If a fox exhibits signs of rabies, such as aggression, stumbling and foaming at the mouth, call your local animal control office.

Crossbows Still Require Pistol Permit

Use of crossbows in North Carolina is now considered a legal hunting method for licensed hunters anytime bow-and-arrow hunting is allowed.

What has not changed is the requirement for legally purchasing a crossbow in North Carolina [reference state statutes N.C. G.S. 14-402, N.C. G.S. 14-403].

State law requires that anyone buying or otherwise receiving a crossbow in North Carolina first obtain a pistol permit from the sheriff's office in their county of residence or hold a valid concealed handgun permit. Questions about obtaining pistol permits and issuance of concealed handgun permits should be directed to the local sheriff's department.

The N.C. Wildlife Resources Commission does not regulate the sale or purchase of firearms and crossbows.

Current hunting and fishing regulations for 2010–2011 seasons may be found in the *North Carolina Inland Fishing, Hunting and Trapping Regulations Digest*, at www.ncwildlife.org or from wildlife service agents located throughout the state.

CALENDAR OF EVENTS

FRIDAY–SUNDAY, OCTOBER 1–3

Check out the seafood and entertainment and learn about the cultural traditions that surround commercial fishing at the 24th Annual N.C. Seafood Festival in Morehead City.
Visit www.ncseafoodfestival.org.

THURSDAY–SUNDAY, OCTOBER 14–24

Enjoy the N.C. Wildlife Resources Commission exhibits—including a shooting range and mobile aquarium—plus craft demonstrations, livestock exhibits, midway games and rides, concerts, food and more at the N.C. State Fair in Raleigh.
Visit www.ncstatefair.org

PICK UP A FOX SQUIRREL BUTTON AT OUR EXHIBIT AT THE N.C. STATE FAIR.

SATURDAY–SUNDAY, OCTOBER 16–17

Pay homage to the state's most popular mollusk at the 29th annual North Carolina Oyster Festival in Shallotte. Events include oyster shucking contest and oyster stew competition.
Visit www.brunswickcountychamber.org

Readers should check with the contact listed before traveling to an event. Items for listing should be conservation-oriented and should be submitted at least four months in advance to jim.wilson@ncwildlife.org, or call (919) 707-0177.

Markham Wins Lifetime Sportsman License

At only 7 years old, Curtis Markham is an avid outdoorsman who loves to hunt and fish. Now, thanks to Neuse Sport Shop in Kinston, Curtis will be able to hunt and fish in North Carolina without ever purchasing a license.

MELISSA MCGAW / NCWRC

License winner Curtis Markham, center, with Neuse Sport Shop owner Russell Rhodes, left, and Ned Jones of the North Carolina State Council of Trout Unlimited.

Curtis, who is from South Mills, was one of three young anglers to take home lifetime licenses as part of a statewide drawing for participants in 46 kids' Fish for Fun events, which were held in May and June in celebration of National Fishing and Boating Week 2010. He won the grand prize, a unified lifetime sportsman/coastal recreational fishing license, valued at $450.

Curtis, along with his family, attended the N.C. Wildlife Resources Commission's business meeting in July, where Chuck Bennett, commission vice-chairman, presented him with the lifetime license and certificate.

Curtis' license gives him statewide hunting privileges, including hunting for big game, hunting on game lands and waterfowl hunting, as well as fishing privileges in all public waters from the mountains to the coast.

Eight-year-old Hunter Stopp of Rockingham and 6-year old Allyssa Vestal of Elkin won lifetime freshwater fishing licenses valued at $250 each. These licenses were donated by the N.C. State Council of Trout Unlimited and Bayside Marina and Grill in Edenton.

Hunter's and Allyssa's licenses give them fishing privileges in all public inland waters in North Carolina, including designated mountain trout waters, trout waters on game lands and joint waters.

Allyssa participated in the kids' fishing event at Tumbling Rock Reservoir. Curtis participated in the Mid-Atlantic Christian University fishing event in Elizabeth City, and Hunter attended the McKinney Lake Fish Hatchery kids' fishing event in Hoffman.

In addition to these three events, the Wildlife Commission, along with the U.S. Forest Service and Bass Pro Shops, supported 43 additional free fishing events during National Fishing and Boating Week, all aimed at promoting fishing as a fun activity the whole family can enjoy.

At each event, registered participants were automatically entered into a random drawing for fishing-related prizes. Bass Pro Shops and the Wildlife Commission donated rods and reels, tackle boxes, fish playing cards and spools of fishing line. A list of winners is posted at www.ncwildlife.org.

"These fish-for-fun events are great opportunities for kids and their families to learn the basics of fishing and enjoy quality time together," said Bob Curry, chief of the commission's Division of Inland Fisheries.

"Generous donations by Neuse Sport Shop, Bayside Marina and Grill, Trout Unlimited and Bass Pro Shops, along with the assistance of the U.S. Forest Service and local sponsors, have helped make these events even more fun for the entire family."

IN SEASON

This month, these seasons are open in North Carolina:

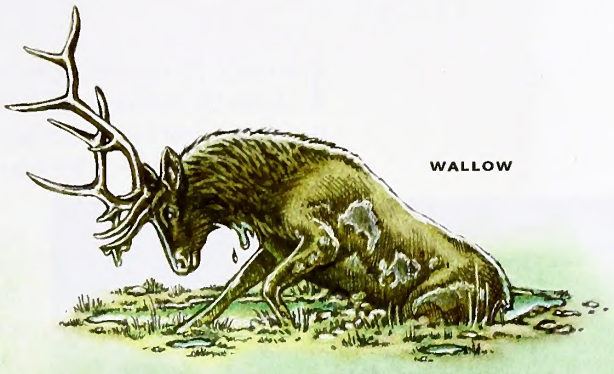
Black Bear: See *Regulations Digest* for seasons and locations.
Bobcat: Oct. 18–Feb. 28.
Crow: Through Feb. 28.
Hatchery Supported Trout Waters: Through Feb. 28.
Mourning and White-Winged Dove: Through Oct. 9.
Raccoon and Opossum: Oct. 18 (sunrise)–Feb. 28.
Rails, Gallinule and Moorhen: Through Nov. 12.
Ruffed Grouse: Oct. 18–Feb. 28.
Squirrel: Gray and red Oct. 18–Feb. 18; fox Oct. 18–Dec. 31 in selected counties.
White-tailed Deer:
Eastern: Bow season through Oct. 1; muzzleloader season Oct. 2–15; gun season Oct. 16–Jan. 1.
Central: Bow season through Oct. 29; muzzleloader season Oct. 30–Nov. 12;
Northwestern: Bow season through Nov. 5;
Western: Bow season through Oct. 2 and Oct. 18–Nov. 20; muzzleloader season Oct. 4–16.
Wild Boar: Through Feb. 28 only in Cherokee, Clay, Graham, Jackson, Macon and Swain counties. In the other 94 counties of the state, feral hogs are not considered to be wild boars, and the commission does not regulate them.
There is no closed season or bag limit for groundhog, coyote, striped skunk and nutria. There is an open season for taking beaver with firearms or bow and arrow during any other open season for the taking of wild animals.

Check the *2010–2011 North Carolina Inland Fishing, Hunting and Trapping Regulations Digest* for bag limits and applicable maps or visit www.ncwildlife.org.

How Do Bull Elk Assert Dominance?

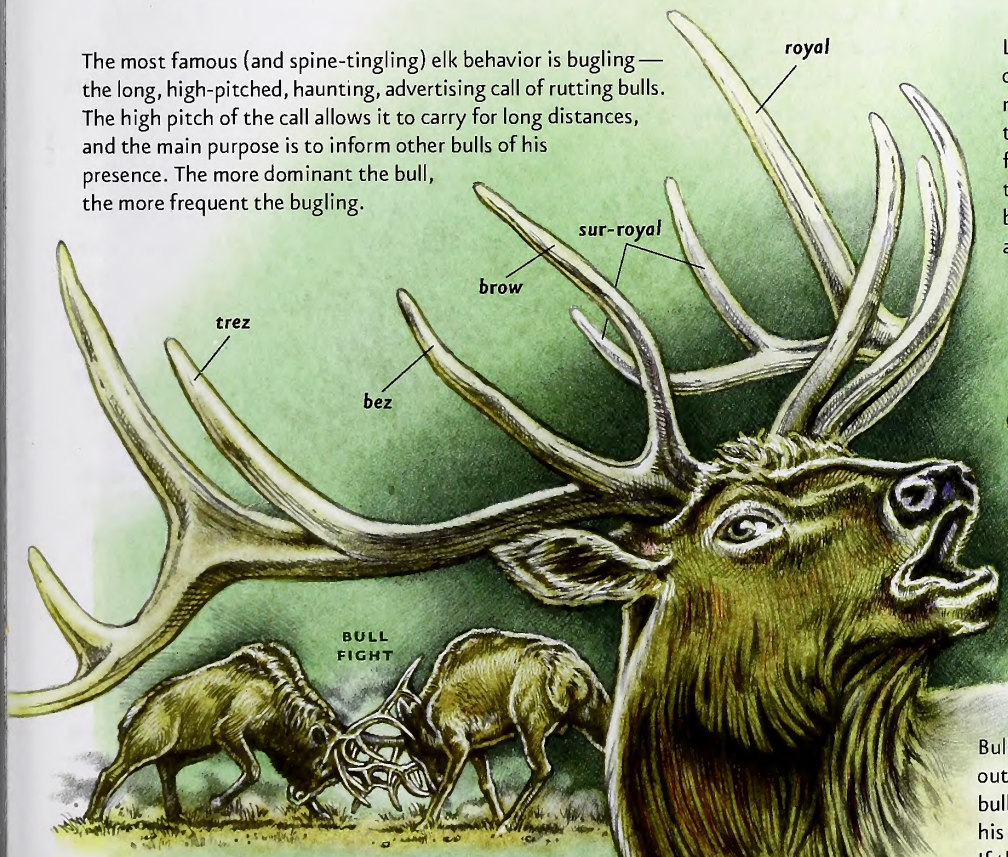
written by Clyde Sorenson
illustrated by Jim Brown

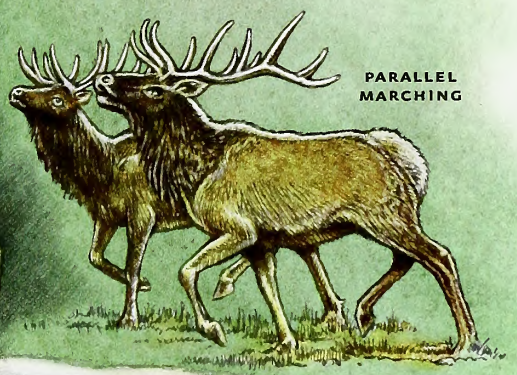
ELK GATHER IN LARGE HERDS AS PROTECTION from predators, but they are "selfish herders." They have to compete with each other for food — and the bulls for the multiple cows that constitute their harems. The bulls use several modes of communication in this crucial competition.



Like most mammals, elk use scent to communicate. Rutting bulls create wallows in damp spots near creeks. The bull urinates in the wallow, and then rolls in the fragrant mud. This together with frequent urination on its belly, legs and mane, and the secretions of glands near the eyes, give the bull a musky (to say the least) aroma highly attractive to the cows.

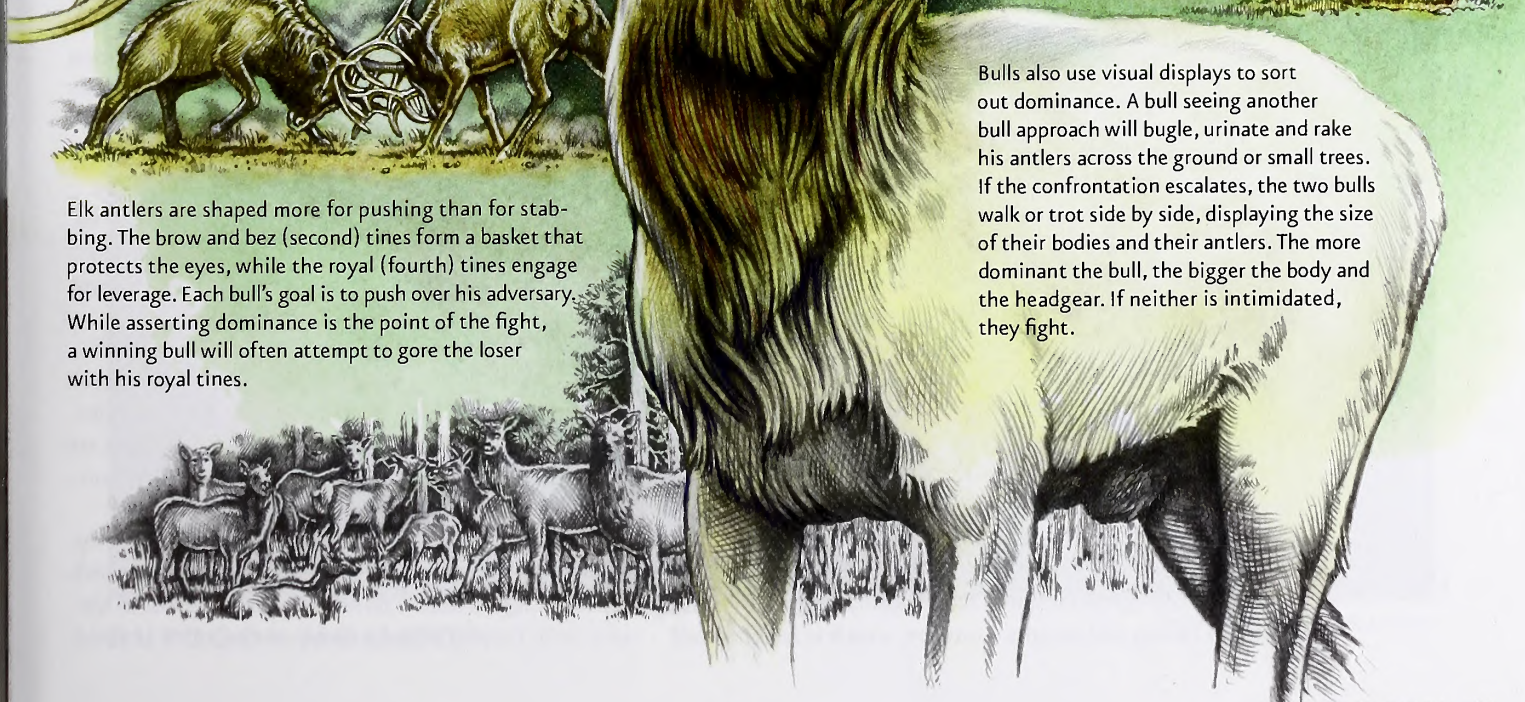
The most famous (and spine-tingling) elk behavior is bugling — the long, high-pitched, haunting, advertising call of rutting bulls. The high pitch of the call allows it to carry for long distances, and the main purpose is to inform other bulls of his presence. The more dominant the bull, the more frequent the bugling.





Elk antlers are shaped more for pushing than for stabbing. The brow and bez (second) tines form a basket that protects the eyes, while the royal (fourth) tines engage for leverage. Each bull's goal is to push over his adversary. While asserting dominance is the point of the fight, a winning bull will often attempt to gore the loser with his royal tines.

Bulls also use visual displays to sort out dominance. A bull seeing another bull approach will bugle, urinate and rake his antlers across the ground or small trees. If the confrontation escalates, the two bulls walk or trot side by side, displaying the size of their bodies and their antlers. The more dominant the bull, the bigger the body and the headgear. If neither is intimidated, they fight.



When Cute Eats Cute

written by Jim Dean

I reached the river about mid-afternoon, and though I knew the fishing was likely to be poor until later, there was a spot I wanted to lay claim to before anyone else arrived. Besides, a few trout might be rising early.

JIM DEAN

I parked in the shade of some lodgepole pines and carried my gear to the edge of the river where weathered volcanic boulders lay in profusion. The Henry's Fork of the Snake River, easily a hundred yards wide at that point, flowed past in a slick glide, the surface rippled only by occasional submerged rocks and dense aquatic vegetation. No trout were rising yet, but I knew that there would be mayflies hatching later, and certainly caddis and spinners on the water at dusk.

I settled against a rock to wait and sipped a cold Moose Drool (a tasty local brew with a whimsical moniker). In the distance, I could see the rim of the ancient 30-mile-long caldera that encloses this high Idaho valley. To my back, the Grand Tetons were visible 60 miles distant. A golden eagle wheeled high overhead. I was on the verge of an impromptu nap when I saw a movement out of the corner of my eye —something small, brown and moving swiftly.

There is, for example, no evidence that the concepts of morality or cruelty exist in nature — they are entirely human-inspired contrivances.

Moments later, a weasel about a foot long loped across the rocks only a dozen feet away. With each hop, his thin body arched like an inchworm's. He dove for cover when he spotted me. Seconds later, his head popped up just beyond the rock I was leaning against. We stared at each other. Finally, apparently deciding that I posed no threat (or was too big to eat), he resumed hunting for mice, voles and insects among the rocks, occasionally stopping to check me out.

Hunters and fishermen have many opportunities to observe wildlife, but weasels — despite their wide range and relative abundance — are a rare treat. I have encountered lots of mink, otters and other members of the *Mustelidae* family over the years, but this was the first weasel I'd ever seen up close in the wild, nor did it seem greatly spooked by my presence.

Later research suggested that this was likely a short-tailed weasel, common throughout many of our western and northern states. As an adult, it grows to about 13 inches and weighs 6 ounces, which is roughly half the weight of the larger long-tailed weasel which averages 18-20 inches as an adult and ranges throughout most of the continental United States. Both have black-tipped tails, unlike the much smaller and less common 8-inch least weasel found mostly in our upper midwestern and northeastern states. All three usually acquire snowy white coats in winter and are then called ermine, though the long-tailed and short-tailed weasels keep their black-tipped tails.

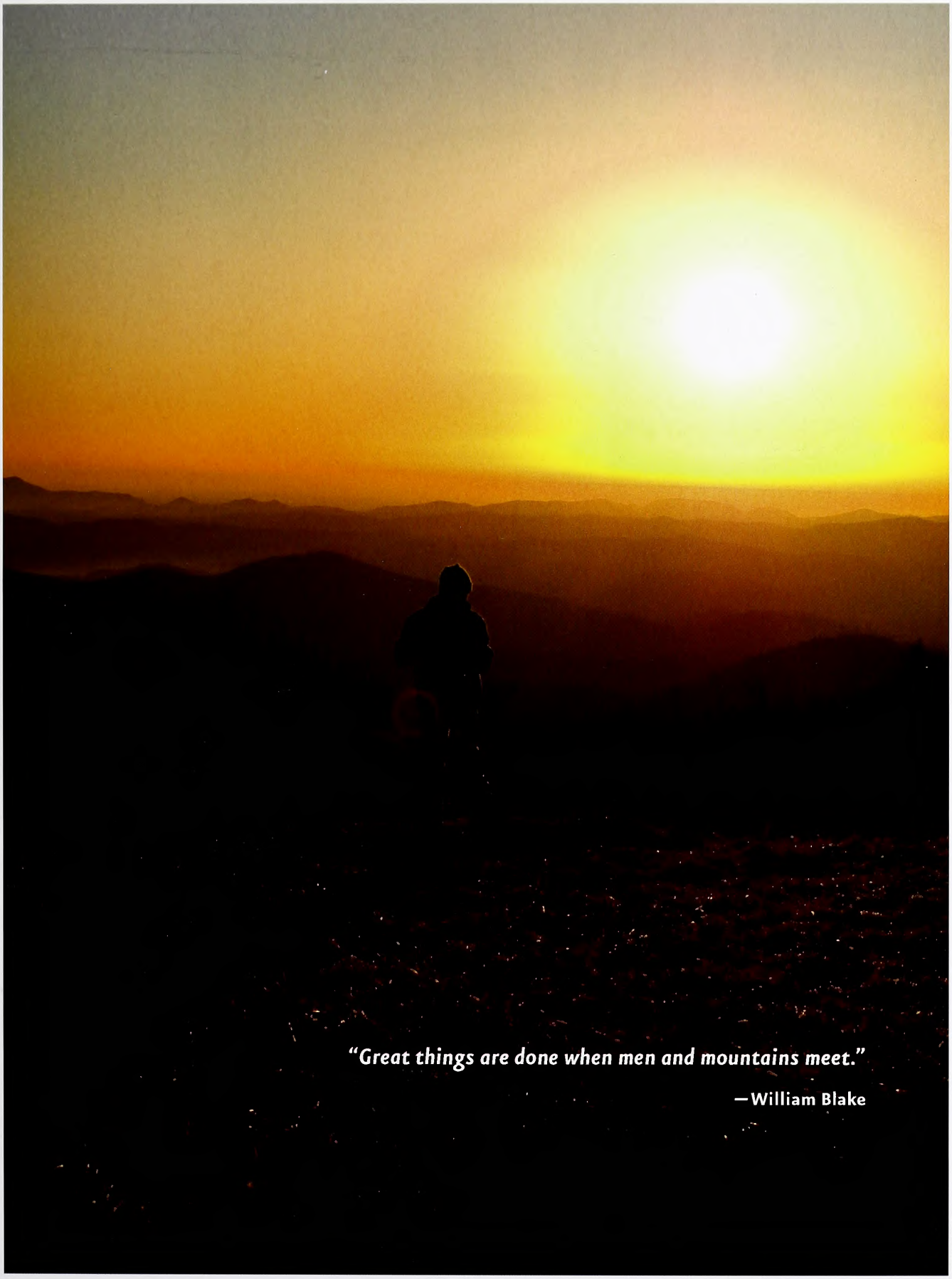
I might have been content with simply seeing a weasel, except that every time I told of my encounter, I ran into a scientific contradiction. Wildlife biologists take an unsentimental view of nature borne out by every legitimate study ever conducted. There is, for example, no evidence that the concepts of morality or cruelty exist in nature — they are entirely human-inspired contrivances. The human animal may choose to live under some moral code and avoid actions we label as cruel, but no other animal does. We may think of predators as evil and their prey as innocent, but that is a silly conceit. Predators, including that inquisitive weasel and magnificent golden eagle, are essential elements of all life, neither cruel nor immoral.

Likewise, biologists abhor the notion of cuteness, but it was hard to avoid using "cute" to describe this little weasel even though, for its size, it's one of the fiercest predators in the animal kingdom.

It occurs to me, however, that some form of cuteness may occupy a legitimate niche in nature. It's probably not the same "cute" we apply to baby bunnies, speckled pups and fuzzy weasels, however. Most animals are programmed to seek mates for the procreation of the species, and forms of attraction that aren't fully understood dictate the choice of those mates. For example, we can only speculate about what, apart from convenience, attracts one Canada goose to another, but part of that attraction is clearly physical. After all, many species develop physical characteristics to attract mates, and it may be that a gander considers his mate "smoking hot," and maybe even cute, too.

As always seems to be the case, there are other human parallels here. Contrary to popular belief, geese aren't always faithful for life. Both males and females are likely to mess around, especially once the eggs are laid and the future of the species is assured. Relationships, it seems, can go sour for any of us.

And since I'm sure you're wondering, "Pop goes the weasel" is thought to be a nonsense lyric from an 18th century English dance, its original meaning lost to history. Still, I wish I'd had a camera when mine popped.

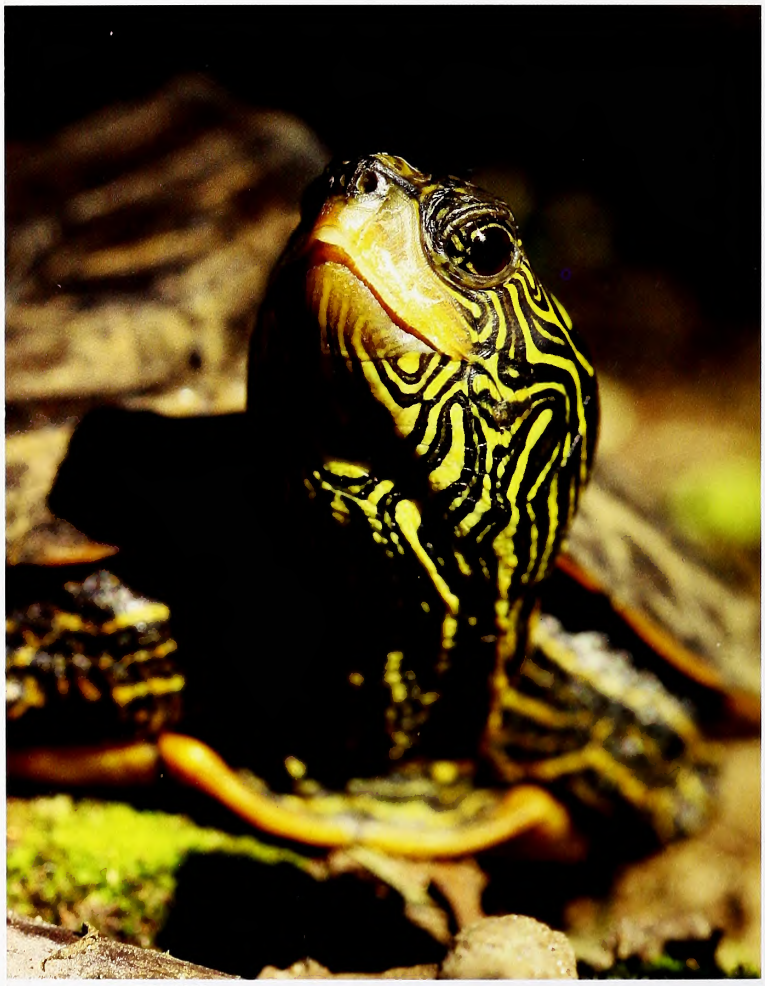


JORGE PACHON

OUTDOOR MOMENT

Sunset in Pisgah National Forest

IN THE NOVEMBER ISSUE



TODD PUSSER

◀ **MAPPING THE WAY**
A trio of biologists finds previously undocumented map turtles in North Carolina.

SPOTTED: SEATROUT!
The aggressive, handsome, delicious speckled trout has long been prized by inshore saltwater anglers.

A LONG FALL
A little-known geographic feature played a big role in the state's habitat formation and human history.

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WILDLIFE IN NORTH CAROLINA

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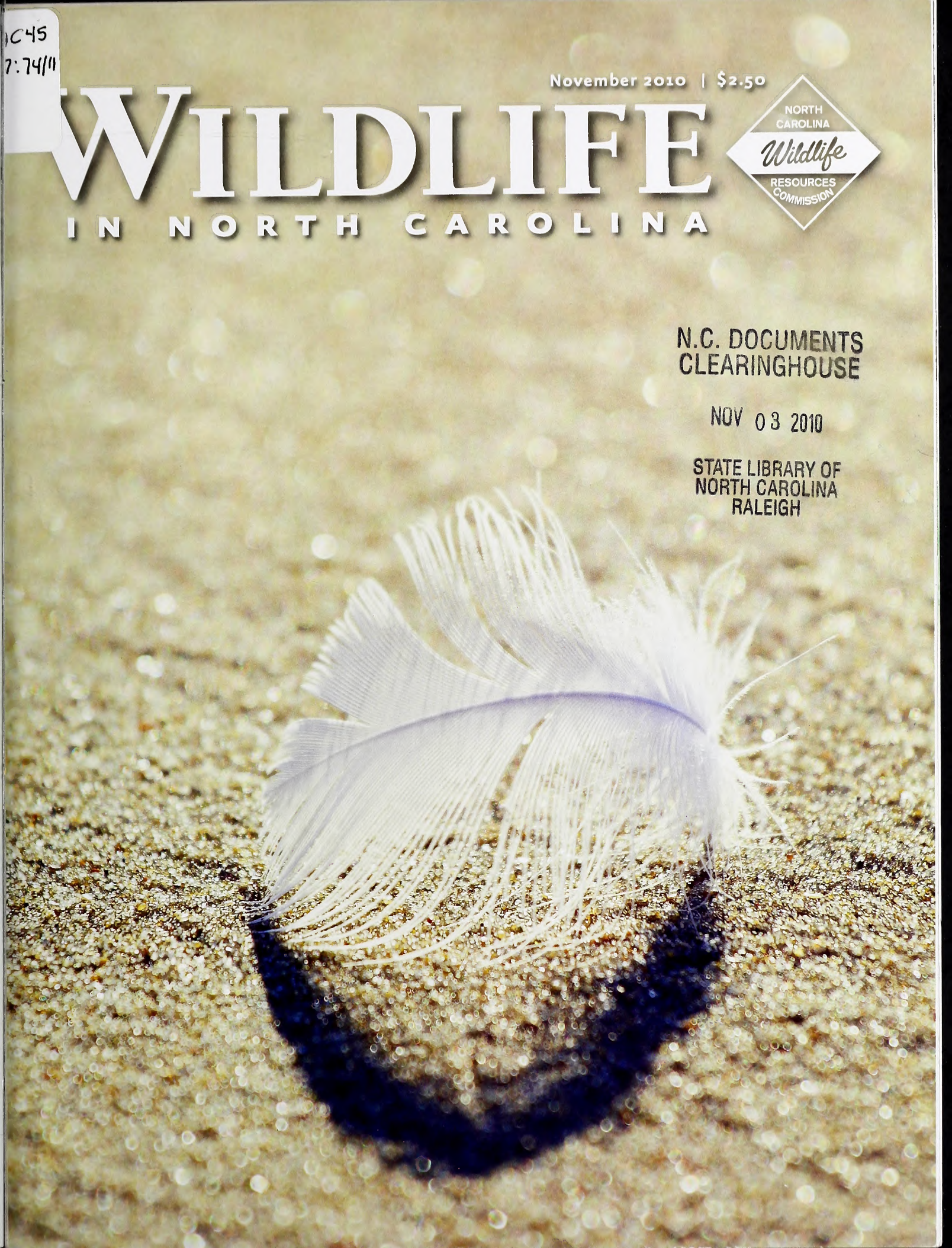

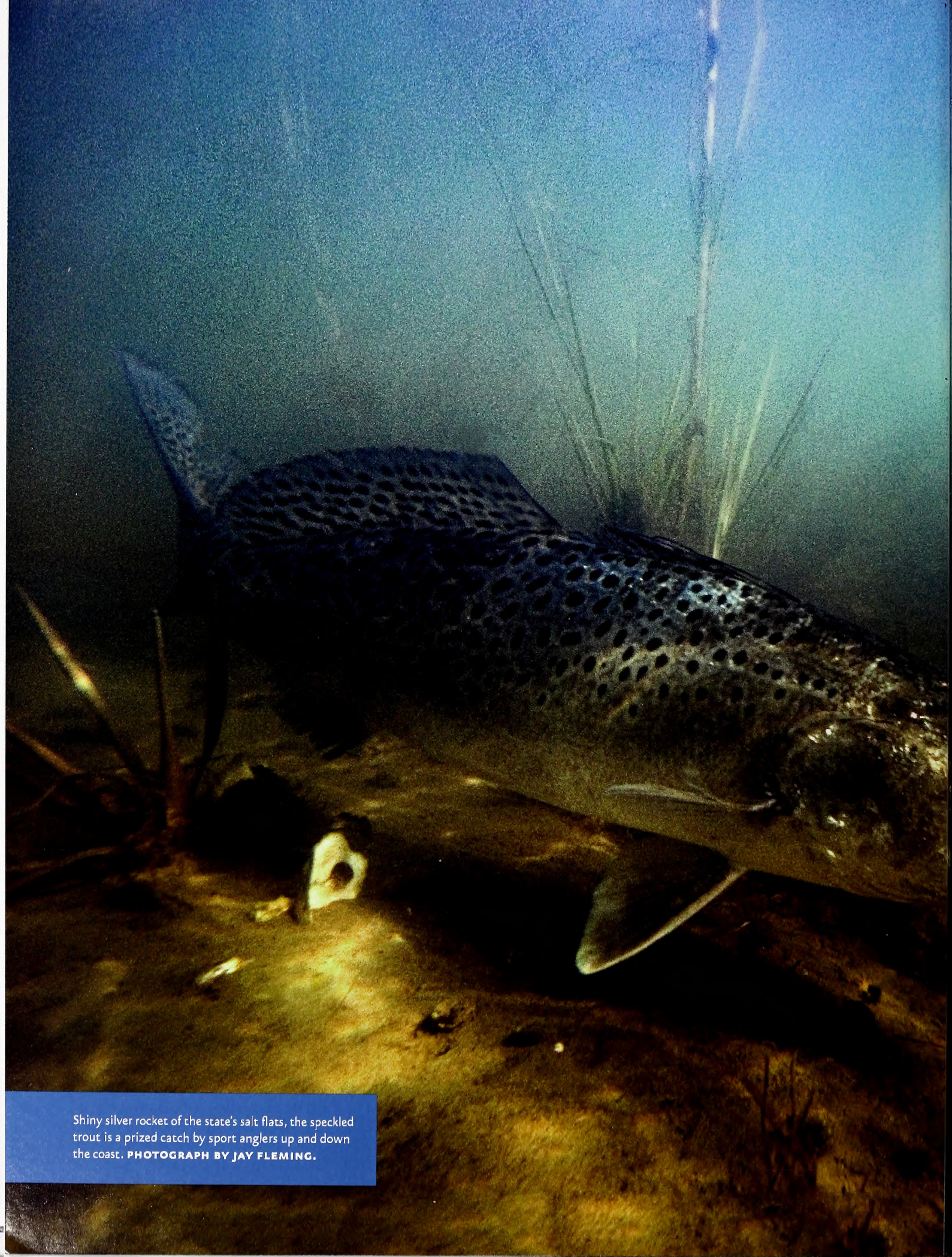

Shiny silver rocket of the state's salt flats, the speckled trout is a prized catch by sport anglers up and down the coast. **PHOTOGRAPH BY JAY FLEMING.**

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Cover: The Wings Over Water Festival covers a lot of coastal territory each November. Participants can expect to see signs both obvious and subtle of the area's avian and terrestrial wildlife. PHOTOGRAPH BY DAN WATERS.

Wildlife in North Carolina is the official educational publication of the North Carolina Wildlife Resources Commission. It is dedicated to the sound conservation of North Carolina's wildlife and other interrelated natural resources and also to the environment we share with them.

EDITOR'S NOTE

I admit it—I am a word geek. Much of my time consists of obsessing over how to put words together so they sound good. (Geez, I need to work on that sentence.) I don't send e-mails that contain incomplete sentences, and I am the world's slowest text-messager because my texts must contain proper grammar.

TODD PUSSER

A geek used to be someone who was uncool, but these days, there is little shame left in being geeky. People get geeked over trout flies, or compound bows, or birdwatching lists, or whitewater kayaking. The connotation of "geek" has evolved a bit to mean that you are passionate about something and maybe spend a little too much time doing it.

Jeff Beane, Bob Davis and Todd Pusser are natural-science geeks. The three men described in Beane's story "Map Quest" (page 4) were stoked beyond belief when they located and positively identified a turtle species that had never been documented in North Carolina. If you think about it, that is a pretty cool achievement. Dozens of decades after William Bartram, Alexander Wilson, Mark Catesby, H. H. Brimley, John Lawson and other famous naturalists of old roamed our state, it's amazing that there are any new animals left to find.

Beane, Davis and Pusser didn't actually discover the common map turtle in North Carolina—biologists from the N.C. Wildlife Resources Commission can claim that honor. But the state biologists weren't sure exactly what species the turtle was, and someone had to perform the due diligence necessary to positively ID the species and determine if it existed in our state in significant numbers.

The turtle-tracking trio made three trips (one of them without Pusser) all the way to the very western tip of the state to hunt map turtles, and in the process saw other turtles they had not previously seen (but were already recorded in the state). The work wasn't easy, but it was rewarding, and the three men are now free to revel in their science geekdom. In a way, they are latter-day herpetological geek heroes—modern Catesbys, if you will.

There are lots of things in nature to get geeked about, and some of them might even be described as cool. But don't worry so much about labels. Few things are more fun than exploring outdoors and learning about animals. Embrace your inner geek, and perhaps you will be next to help document a species in North Carolina.

Greg Jenkins

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NOVEMBER 2010 VOLUME 74, NUMBER

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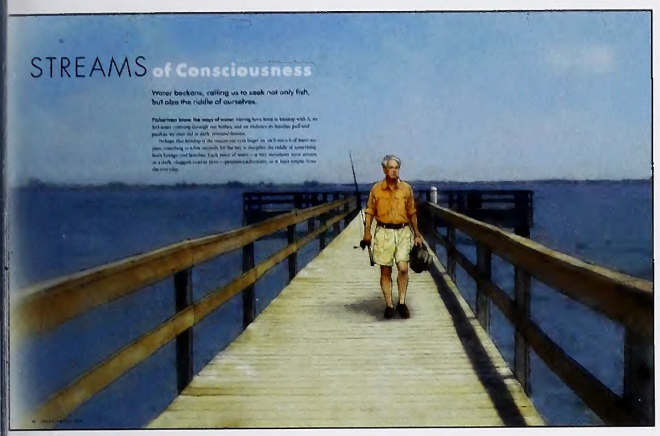


Streams of Satisfaction

We love the magazine as new subscribers, and Jim Wilson's article "Streams of Consciousness" (Sept. 2010) in particular. I'm sure it will be reread, as I've done with much of what Sig Olson wrote. Like Jim, I'm never certain that hooking the quarry was ever my ultimate purpose for being on or near the water. I love flowing water best, with the substrate, the water column, the surface tension and the banks and to be at one with my aquatic niche. I'm an aquatic ecologist — a comrade biologist showed me years ago it was all right to wade into pools of most any description and await the magical connection that follows. I've never looked back.

Truth is, Jim and I are brothers, kin who understand something very, very special, and through the written word can share what for us is timeless in a way. Of course we love the Pamlico Sound of which Jim wrote, and Morehead City, and now the Toe and Cane rivers in Yancey County, where we now reside. Thanks for writing a very informative and important article, from the heart.

Barry Passmore
Burnsville

Thank you for the piece "Streams of Consciousness" in the September issue. I'm 65 now, born in New Jersey but an N.C. resident for 36 years, and if anyone asks, I tell them I like to fish. But I, too, have passed up on the opportunity to wet a line more times than I have comfort remembering. I could almost smell the wetlands odor in the words you wrote. The special camaraderie among or between fisherpeople, too, is well worth the reflection. Anyway, thanks — it made my day!

Peter Sexton
Winston-Salem

Wise Use of Resources

I was delighted to read about the WISe Program and the cost savings it is bringing to the N.C. Wildlife Commission ("WISe Guys," Sept. 2010). But I am equally delighted to imagine the impact it is likely having on the inmates that get to participate in it. I suspect that it is making a significant difference for each one. There is nothing like the satisfaction that comes with creating or producing something concrete to enhance one's sense of self. The WISe program undoubtedly gives this opportunity to each participant. I only hope that you will consider expanding it to accomplish more cost savings to the Wildlife Commission and to offer a new hope to some inmates who may just need to be shown a new way to approach work and life. Thank you for writing about this great program!

Jackie Sergent
Oxford

Exclusivity Unwelcome

Our family has subscribed to *Wildlife in North Carolina* since the early 1980s. Over the past 25-plus years, I have read and shared articles with family, friends and students. The articles I most remember inspired me to try new activities or visit and explore new places. I don't remember a single article that told me about a place I couldn't visit or an activity that I couldn't join.

Thus, the reason for my letter about "Mill Pond Memories" (Sept. 2010). While I enjoyed the well-written article and the interesting historical photographs, it seemed clear to me that this was a place that I was not welcome to visit, nor would I be able to participate in activities there. The article reminds me of destinations I read about in commercial outdoors magazines promoting particular regions to visit, activities to do, and places to lodge and eat. At least in those articles I could, for a fee, participate in the mentioned activity and stay in the recommended location.

"Mill Pond Memories" should be published in a Columbus County newspaper or regional tourism guide, not in *WINC*. I hope that similar type articles that promote exclusivity and elitism will be absent from the pages of *Wildlife in North Carolina* in future issues. Perhaps a gentle reminder of your mission statement listed at the bottom of the table of contents page will help: "... dedicated to the sound conservation of North Carolina's wildlife and other interrelated natural resources and also the environment we share with them."

Chuck Pressley
Easley, S.C.

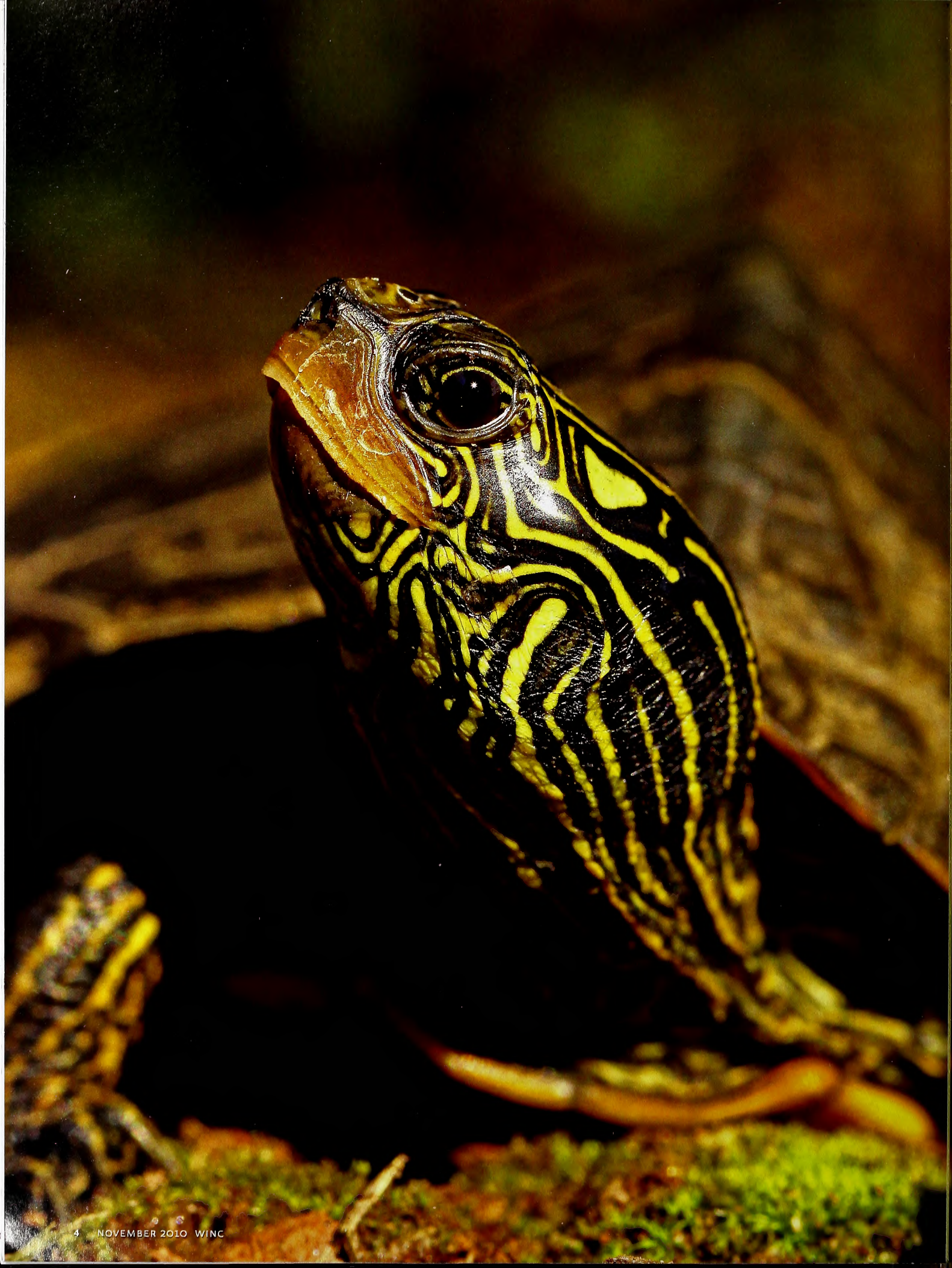
Greg Jenkins: Chuck, "Mill Pond Memories" is a good fit for Wildlife in North Carolina *for several reasons. The Mill Pond Club practices land, water and wildlife conservation. Rather than developing the property and destroying habitat, the Edwards family, which owns the land, chose to preserve the pond and surrounding farmland. Club members use quality deer management principles and plant crops that wildlife thrives on. The N.C. Department of Cultural Resources found the club's hunting heritage worthy of a highway marker. That history is consistent with many similar articles that have appeared in the magazine over the years. Our state is rich with hunting history and with conservation efforts, and the magazine is well within its mission to highlight these efforts on both public and private lands.*

Map Mistakes

On the land trust map that accompanied "With What Time Remains" in the October 2010 issue, we mislabeled Davie and Pitt counties. To see a corrected map, visit www.ncwildlife.org/WINC.

write us

Letters should be sent via e-mail to **letters@ncwildlife.org** *or through regular mail to Letters,* Wildlife in North Carolina *magazine, 1712 Mail Service Center, Raleigh, NC 27699-1712. Please include your name, address and daytime phone number. Letters chosen for publication may be edited for clarity and length.*



Three naturalists on a Mountain turtle adventure document a species never before recorded in North Carolina.

MAP Quest

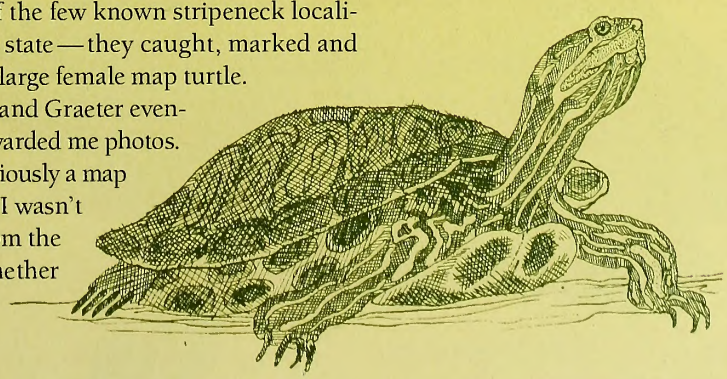
Since before North Carolina became a state, naturalists have worked to inventory its living components. One might assume we'd now have a good handle on what's here. But new and previously undocumented species still turn up—and not all are tiny, obscure invertebrates.

Among vertebrates, our Mountain turtles (with a few exceptions, such as the bog turtle) represent an especially undersurveyed group. The stripeneck musk turtle (*Sternotherus minor peltifer*), unknown in North Carolina until 1982, is still known only from small stretches of the Hiwassee and French Broad river basins—barely within the state—in Cherokee and Madison counties. Of our two softshell subspecies, the Eastern spiny softshell (*Apalone s. spinifera*) is known in only a few localities and even fewer voucher specimens, mostly from the French Broad. Eastern musk turtle (*Sternotherus odoratus*) records are lacking from many Mountain and foothill counties. The western range limits of the Eastern mud turtle (*Kinosternon subrubrum*) and river cooter (*Pseudemys concinna*) are poorly known.

Some of our far western rivers and lakes have long spawned rumors of "basking turtles"—species that routinely sun on logs or rocks, like cooters, sliders, painted turtles and map turtles. (Most turtles occasionally bask, but these members of the family Emydidae are famous for it.) What were these mysterious turtles? Sliders (*Trachemys scripta*) were known in the state only as far west as Gaston County. River cooters ranged no farther than lakes Lure and Adger in Rutherford and Polk counties. Painted turtles (*Chrysemys picta*) occur sporadically at lower elevations in the Mountains. Were they the basis for all the reports?

I had long intended to do some aquatic turtle surveying along our western border, but there were always other things to do, and the far western Mountains seemed worlds away. But in August 2007, wildlife biologists Gabrielle Graeter, Kendrick Weeks and Anne Outlaw found something interesting. While surveying for stripeneck musk turtles in Cherokee County's Shuler Creek—a tributary of the Hiwassee just inside the state line and one of the few known stripeneck localities in the state—they caught, marked and released a large female map turtle.

Weeks and Graeter eventually forwarded me photos. It was obviously a map turtle, but I wasn't certain from the images whether



WRITTEN BY JEFF BEANE

PHOTOGRAPHED BY TODD PUSSER

a common map turtle (*Graptemys geographica*), a Ouachita map turtle (*G. ouachitensis*) or something else. Map turtles can be difficult to identify. With the exception of introduced individuals or populations (e.g., an introduced Mississippi map turtle population thrives in High Rock Lake), map turtles were unknown in North Carolina. Graeter and I both forwarded some of the photos to various *Graptemys* experts. Their responses, though interesting, were far from unanimous.

Map Quest, Part I: UNCERTAIN SUCCESS

Clearly, someone needed to determine what these turtles were, not to mention exactly where and in what sorts of numbers. I knew just who. Wildlife photographer Todd Pusser was always wide open for any new natural history adventure, and turtle fanatic Bob Davis would do almost anything turtle-related. Besides the possibility of confirming something new to the state, none of us had seen wild stripeneck musk turtles or Eastern spiny softshells, and there was always the chance of documenting new localities for these or other species. No arm-twisting necessary.

THOUGH UNCERTAIN AS TO EXACTLY HOW MANY TIMES I'VE SEEN DAVIS GRINNING WITH A TURTLE, I'M DEAD SURE NONE OF THEM MATCHED HIS GRIN ON THAT DAY.

So on August 4, 2008, we headed for the far western end of the state. Our plan was to trap the Hiwassee and its tribs and visually search for basking turtles wherever we found likely spots. Reaching western Cherokee County in late afternoon, we set several turtle traps in Shuler Creek, near its confluence with the Hiwassee just inside the state line, and spent the remaining daylight scoping out the few coves of Hiwassee Lake that were visible from the road.

Come morning, we stopped at the Hiwassee dam to scan the lake for basking turtles. None were to be seen, except—just by the dam, on a stump near shore—a small juvenile basked. With binoculars I could see it was either a slider or a map turtle. Soon my spotting scope was on it—definitely a map turtle. A Ouachita map turtle, I initially thought, based on the head pattern. We were looking at something new to the state, not to mention a "lifer" for us all. Todd snapped photos with the enormous lens he calls "Big Gun," so we'd have some documentation before the creature vanished forever. But Bob dismissed that notion—he reckoned he'd catch that turtle, and out he waded with his dip net while Todd and I kept watch from the bridge. The turtle dropped into the water long before he reached it, but Bob was unfazed. It would resurface, he said, and after a 15-minute wait (negligible for a veteran turtle stalker), it did. Bob couldn't see it from his angle, so we called down directions. As Bob slowly lowered his net, the little turtle swam around the side of the stump, and Bob grabbed it by hand.

Though uncertain as to exactly how many times I've seen Davis grinning with a turtle, I'm dead sure none of them matched his grin on that day. Here was something previously undocumented. It would (taxonomic name changes aside) represent the first reptile genus added to our state fauna list since *Seminatrix* (the black swamp snake) in the 1940s. We saw no sign of other turtles in that spot, but we'd already accomplished what we'd come for. Or had we?

Arriving at our traps, we found that two had been stolen. I regretted having left those visible from the dirt road. Distrust always seemed a hard lesson for me. The remaining traps contained a big snapper, a big bullfrog and a big white sucker (which would later prove an important record for the Hiwassee drainage in North Carolina). We also had an adult male stripeneck musk turtle—a lifer species for Bob and a new subspecies for Todd and me (though we'd seen loggerhead musk turtles, *Sternotherus m. minor*, previously). None of us had ever gotten two lifer turtles in one day. Bob was like the proverbial pig in slop. Wading the creek produced two more stripenecks, plus shell fragments of a juvenile in raccoon scat. This represented a significant increase in the number of records of this species in North Carolina.

Late that afternoon, we found a large, deep pool in the Hiwassee, just inside the state line, where at least two more map turtles basked on rocks. They looked more like common map turtles than the juvenile we'd caught, but were too far away for positive

identification. Even with Todd's long lens, we couldn't be certain. Donning wetsuit and fins, Todd went snorkeling in the pool, but he couldn't get near them.

The next day we searched unsuccessfully along Cherokee Lake and other accessible portions of the reservoir and river in Cherokee and Clay counties. Returning to the pool we'd found the day before, we saw at least three map turtles basking and swimming. Since our trip was already successful, we decided, after some debate, to explore new territory and try trapping the French Broad in Madison County. The Huff Island area just inside the state line harbored stripeneck musk turtles and softshells, and there was potential for Cumberland sliders, *Trachemys scripta troostii*—a subspecies suspected, but not confirmed, in western North Carolina.

Reaching Hot Springs that evening, we hurried to secure lodging and an extra-large pizza to go. We had traps to set, and the few restaurants would be closed before we finished. The wait for the pizza seemed interminable. By the time our last trap was in the water, it was dark. As we demolished the still-warm pizza off the truck hood under a waxing crescent moon, coyotes singing up the ridge, I wondered why anyone would ever want to be anything but a naturalist.

The next morning, besides two Eastern musk turtles (aka stinkpots), we had a juvenile Cumberland slider. This subspecies was previously known only in eastern Tennessee and extreme southwestern Virginia. We had confirmed two new turtle taxa in North Carolina. This at least offered some compensation for the loss of Todd's wedding band as he snorkeled in the river that afternoon.

The next day we faced a reluctant trip back east, but our traps held another juvenile Cumberland slider. On our way out we observed a third one basking, along with three large Eastern spiny softshells—also lifer subspecies for us all. It had been a remarkably successful and significant trip.

Map Quest, Part II: FRUSTRATED RETURN

But the more I examined our little map turtle, the more uncertain I became. Maybe it was after all a common map turtle, a hybrid or an undescribed species. When I circulated photos, the responses were even more interesting than before. Some respected

Top and middle: Bob Davis wades the Hiwassee River, searching for map turtles. Davis set up turtle traps a number of times before capturing his first common map turtle by hand.

NATURE'S WAYS

Why Do Male and Female Turtles Often Differ in Size?

See Nature's Ways, page 39.

Jeff Beane and Bob Davis set up a turtle trap in an attempt to catch a common map turtle like the one on this log.

authorities tried to tell me the little turtle was a slider or a cooter.

Clearly, we needed more turtles, so on Sept. 15, 2008, Bob and I (Todd wasn't available) set out again, making a nine-hour beeline for the pool where we'd seen the map turtles on the previous trip. Two juveniles were basking, and I collected some old eggshells from hatched nests along the bank. We set traps there and at another site farther downriver. But three days and nights of trapping yielded only two snappers, a stripeneck musk turtle and numerous sunfish.

We spent the days visually searching the river and lakes for more turtles. Oddly, we never saw another turtle near the spot where we'd caught the juvenile, but in the main river channel just inside the state line we saw perhaps 20—always at a distance. We'd see them swimming beside our traps, but not entering.

AS WE DEMOLISHED THE STILL-WARM PIZZA OFF THE TRUCK HOOD UNDER A WAXING CRESCENT MOON, COYOTES SINGING UP THE RIDGE, I WONDERED WHY ANYONE WOULD EVER WANT TO BE ANYTHING BUT A NATURALIST.

Map turtles have some reputation for trap-shyness. They eat mostly mollusks and arthropods, but I knew people who had trapped them with sardines (we also tried fresh fish and crushed clams). Waiting patiently in the water by rocks where we'd seen turtles go in was equally unproductive; they never resurfaced in those spots. Bob did catch a stripeneck that way. I'd never seen him so disappointed. I reminded him that only a handful of North Carolinians had seen stripenecks in the state, and that mere weeks ago he would have been ecstatic.

"It's not what we came for," he retorted, and that was true. We did have some other interesting finds, and numerous side adventures that made excellent stories in themselves. But the map turtles eluded us. Bob reassessed our capture of the juvenile the previous month as purely miraculous.

Map Quest, Part III: MORE CERTAIN SUCCESS

Third time's the charm, 'tis often said, so on June 22, 2009, we staged our third trip. The state budget was such that we couldn't get travel support, but we went anyway—it had become personal. We set out early, arriving by late afternoon at our map turtle pool. Several were basking. We baited traps with sardines, canned corn and canned shrimp. With some daylight remaining, Todd put on his wetsuit and went in, but this time he began diving and "noodling" beneath rocks. Before long, he surfaced with a small male map turtle. It was a fairly typical-looking common map turtle, *Graptemys geographica*. Before dark, he'd caught two more, and we'd seen five stripeneck musk turtles. We'd finally learned how to catch them: dive down and grope around under rocks. And we'd solved the mystery—the young turtle from last summer was an unusually patterned common map turtle.

Come morning, our traps were empty as usual, but we no longer needed them. Todd went aquatic again and caught five more map turtles—a male, two females and two juveniles. We also found three more stripenecks and saw more map turtles downriver on the Tennessee side. They were abundant where they occurred; they just didn't range very far into North Carolina.

At one point I eased down a grassy path to a quiet spot on the river by the state line.

I could count 12 map turtles — mostly adult females — including six on one log. A Swainson's warbler sang from a cane stand, a fine old female box turtle rested by the path, green frogs plunked, and a *Vaejovis*, our only native scorpion, hurried by on some urgent arachnid business. And again I wondered: *Why would anyone ever want to be anything but a naturalist?*

The next day yielded still more map turtles and three more stripenecks, but we weren't finding them anywhere new, so we headed northeast to explore other rivers, pursue lifer salamanders and enjoy the rest of the trip. We kept seven map turtles. Four would become the first North Carolina museum vouchers. Three, plus the juvenile collected previously, would be maintained alive at the museum. Tissues from all would be available for genetic work.

Next Quest?

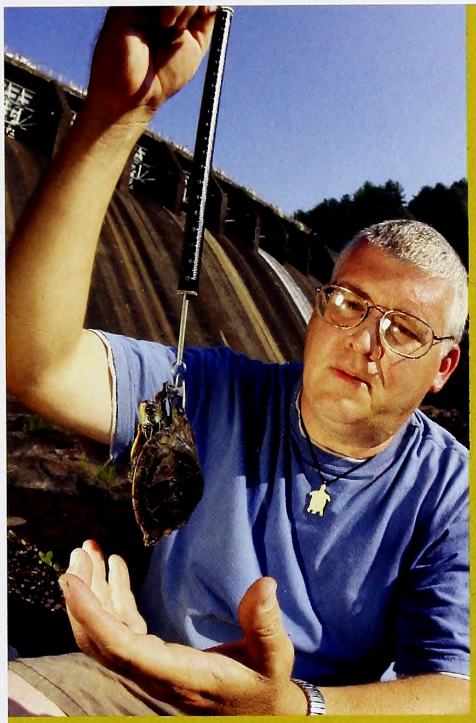
More work is needed to determine the distribution and status of the common map turtle, Cumberland slider, stripeneck musk turtle and spiny softshell (not to mention many other species) in our state, and to determine whether additional surprises exist. Most new species will likely (but not necessarily) turn up along our borders.

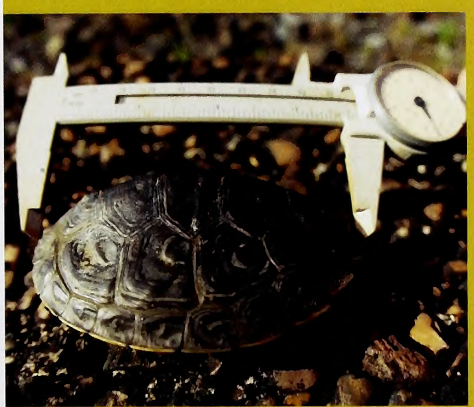
Map turtles and Cumberland sliders aren't our only resident vertebrates to surface recently. The last five years have confirmed the mountain madtom, golden topminnow, Roanoke logperch, Tennessee darter and dwarf blackbelly salamander as North Carolina fauna. In 2009, *Urspelerpes brucei*, the patch-nosed salamander, was dicovered and named in northeastern Georgia. This long-overlooked animal represents the first new amphibian genus to be described in the U.S. since 1961. It has since turned up in South Carolina and may well occur in our southern Mountains. Other species occurring within striking distance of our border include the Smoky madtom, Jefferson salamander, flathead salamander, cave salamander, pig frog, Ouachita map turtle and island glass lizard.

Not everyone gets excited about "peripherals." A species common in Tennessee, South Carolina or Virginia barely enters our state in one stream drainage or on one mountaintop. So what? Nonhuman creatures don't recognize our political boundaries, save perchance natural barriers such as rivers or mountain ranges. But to those of us possessing a strong sense of region, or who work with boundaries because we're wired that way, or because it's our job, or because we have categorical minds or because we're just plain proud of our state (or county) and what lives there — to us those things are important. They're to be celebrated, appreciated, learned about and conserved — and protected, if necessary.

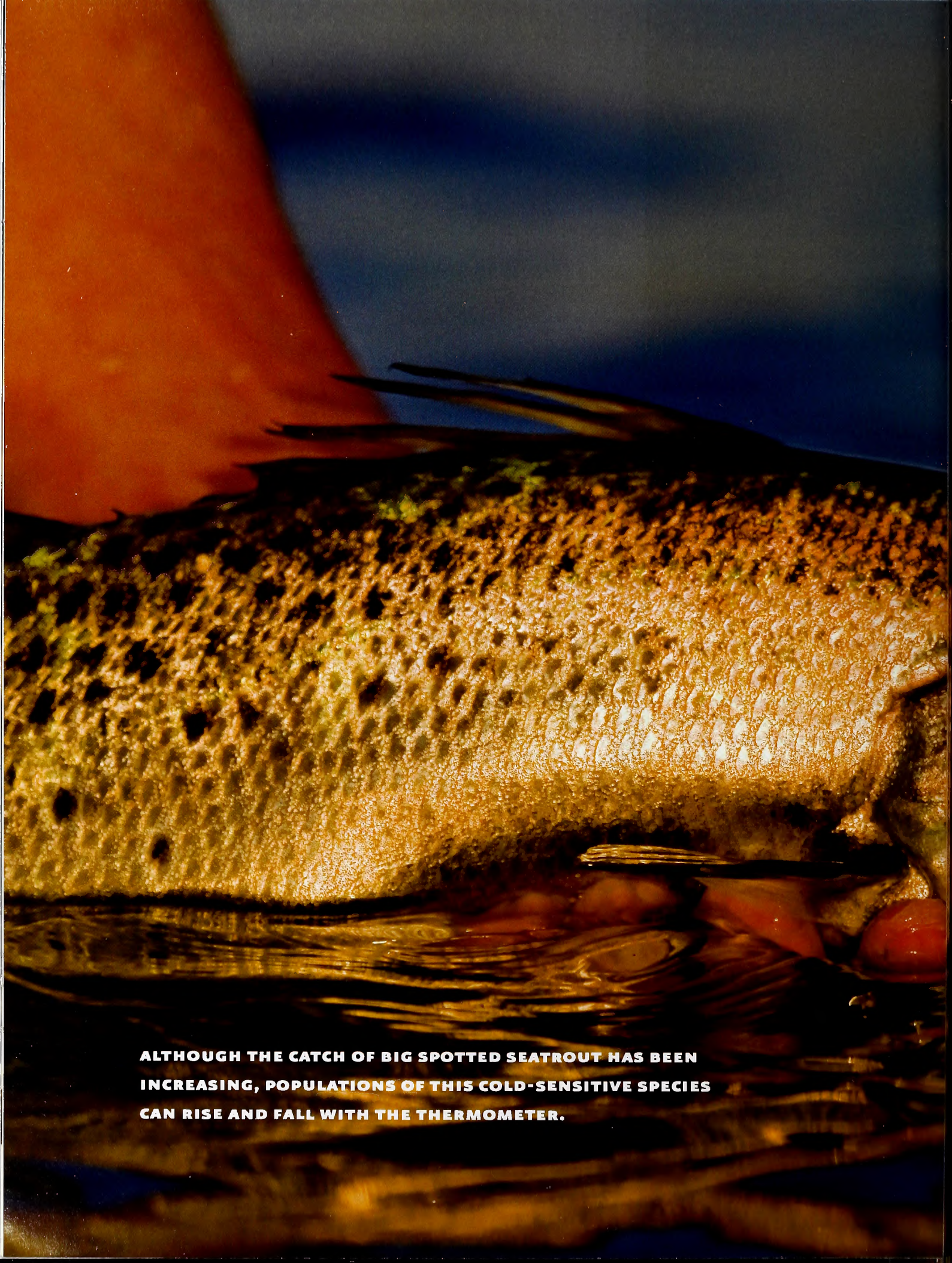
We know a lot about our state, but not everything. North Carolina is still a natural history frontier, and not all new discoveries are made in laboratories. For most known species, we lack complete knowledge of even their geographic distribution, let alone their ecology, behavior, physiology, genetics or population dynamics. If conspicuous, football-sized creatures can go undetected for this long, what of tiny, secretive ones? Well into the 21st century, we're still justifiably asking: *What else is out there?*

Jeff Beane is a herpetologist and a regular contributor to Wildlife in North Carolina.





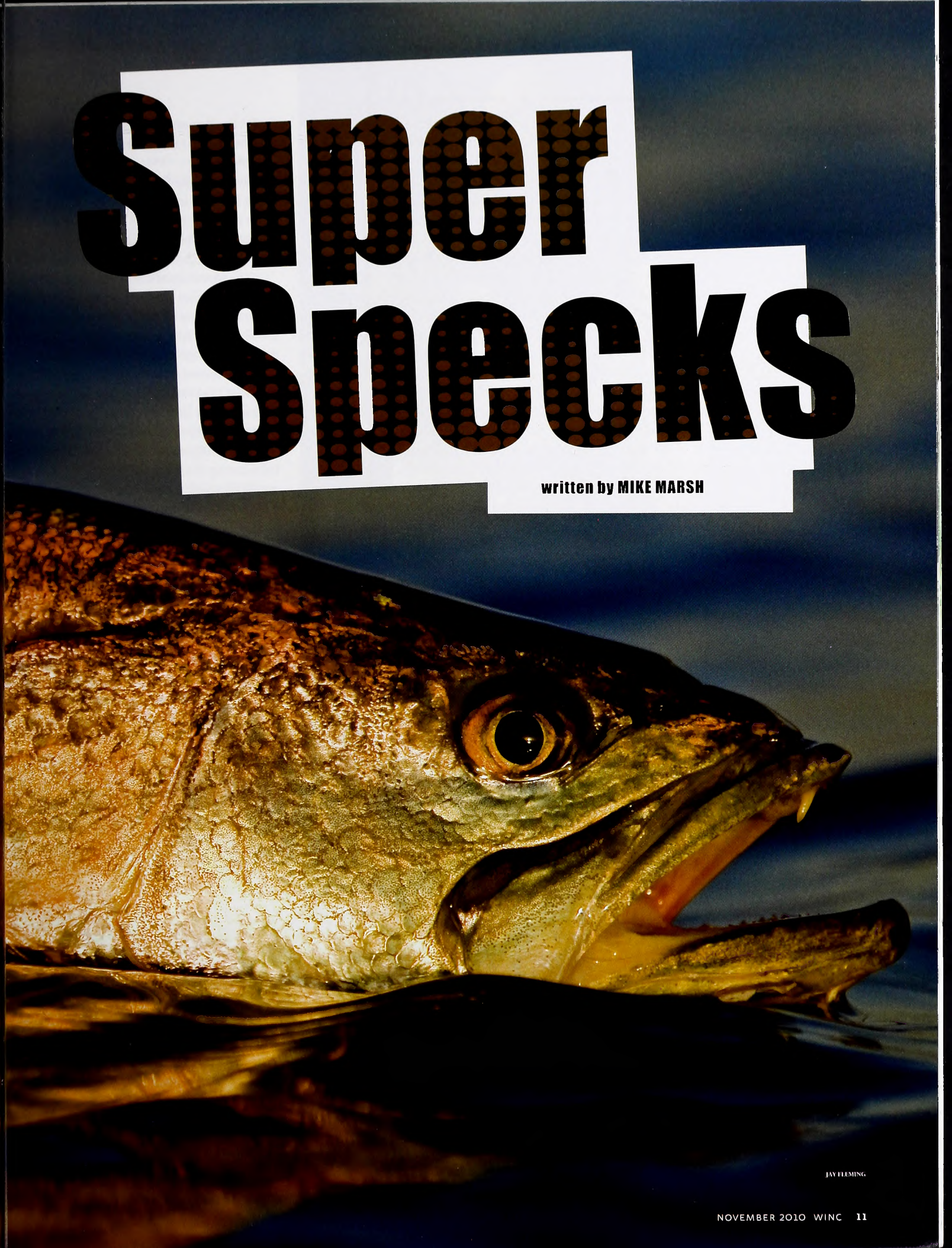
Clockwise from top right: Beane uses binoculars to scan below the Apalachia dam for basking turtles. This stripeneck musk turtle was caught in the biologists' trap. Using calipers to measure the carapace of a map turtle specimen. Beane weighs a small adult male map turtle.



ALTHOUGH THE CATCH OF BIG SPOTTED SEATROUT HAS BEEN INCREASING, POPULATIONS OF THIS COLD-SENSITIVE SPECIES CAN RISE AND FALL WITH THE THERMOMETER.

Super Specks

written by MIKE MARSH



JAY FLEMING

When it comes to inshore saltwater fishing, there is no more beautiful or more coveted fish a recreational angler can catch than an outsized speckled trout. Fishery biologists call the snaggletoothed fish the spotted seatrout (*Cynoscion nebulosus*). But most recreational anglers simply call the fish "specks."

The historic trend of recreational catches of specks has been a roller-coaster ride, especially when it comes to catches of big "gator" specks. Look into the gaping maw of a speck and it takes little imagination to see where this appellation comes from. The fish's mouth opens wider than the depth of its body from belly to dorsal fin, allowing it to grasp large prey in its teeth and swallow it whole. The dagger-like teeth, like those of an alligator, evolved for grabbing and holding, not slicing and shredding.

Recent years have seen a phenomenon occur at the brackish estuaries, inlets and beaches where specks make their home: The "super speck" became commonplace. In fact, big specks became so abundant that the N.C. Division of Marine Fisheries (DMF) raised the weight limit for receiving a citation through its Saltwater Tournament awards program from 4 pounds to 5 pounds in 2008. DMF also instituted a length limit of 24 inches for live release of specks for a citation. At that length, a speckled trout weighs about 4.8 pounds, according to Chris Wilson, a marine biologist with the DMF's License and Statistics Section.

"Based on weighing a large number of spotted seatrout, a 24-inch fish weighs an average of 4.8 pounds and a 25-inch fish, 5.4 pounds," Wilson said. "Twenty-four inches was therefore established as the citation release length."

That's a whopper of a speck in anyone's book. The citation changes were based on several factors, according to Carole Willis, DMF sport fishing specialist and N.C. Saltwater Tournament coordinator.

"In 2007 we sent 1,003 speckled trout citations to anglers," Willis said. "In 2008, 428 weighed fish and five released fish received citations. In 2009, 434 weighed fish and 12 released fish received citations. The decision to increase the citation weight was based on the tradition of the citation program recognizing exceptional catches. We had nearly 500 speckled trout citations in 2007 that weighed between 4 pounds and 5 pounds and that seemed like a lot of small fish compared to all the 5-plus-pound fish we're seeing."

The decrease in citations from 2007 to 2008 was a result of the increase in the weight requirement. Willis said the citation program's advisory board considers information from weigh stations at piers, tackle shops and marinas. Charter captains and private fishermen also have voices on the board. The advisory board agreed with a DMF recommendation to increase the weight limit and with another proposal by DMF director Louis Daniel to add the length limit. The length category exists for many other species of saltwater fish. The division's speckled trout biologist, Beth Burns, agreed with Daniel regarding the length limit. She said it was a great idea because it would encourage the release of super specks.

Indeed, there was a slight increase in the number of citations for released specks in 2009 compared to 2008. Releasing speckled trout is one way to ensure the big fish remain in the water to reproduce, so biologists such as Burns hope the trend will expand. Anglers have been catching so many speckled trout that biologists are becoming concerned. Therefore, a new size limit of 14 inches for a keeper fish was also initiated in 2009. The previous size limit was 12 inches. The daily creel limit remained at 10 fish.

"The minimum size increased because the stock assessment showed the stock was overfished and overfishing was occurring," Burns said. "The spawning stock biomass was lower than we would like and fishing mortality was high."

Burns said the longer size limit would allow more females to spawn before anglers can keep them, because 98 percent of females are mature at 14 inches compared to 89 percent at 12 inches.

"The most incredible thing about speckled trout is they can spawn repeatedly once they are mature," Burns said. "From May through October, they spawn repeatedly in what we call a protracted spawn. That gives them the ability to recover from environmental events quickly. Their spawning success is better during higher salinities than lower salinities. Since they spawn over the entire season, it increases their chances of spawning successfully during changing water conditions. Their entire life cycle is estuarine, so salinity plays a big role in spawning success."

Once they hatch, specks exhibit exceptional growth rates, which is another reason they can recover quickly from adverse environmental events. A big female trout produces more eggs than a smaller female.

"The larger females have bigger egg capacities, but younger fish are significant in the entire picture because there are so many more of them," Burns said. "Eighty percent of speckled trout are age 0 and 1. The large proportion of smaller, younger fish may be a natural occurrence, but for most fish populations

TIM ELLIS

MIKE MARSH

Capt. Lee Parsons of Gottafly Guide Service shows off a nice cool-weather speckled trout taken on the South River with a suspending twitch lure.

we want to see older, bigger fish. To grow a citation seatrout takes two to three years and a fish that size can be male or female."

One thing anglers can do to help speckled trout populations is to limit catch-and-release fishing wherever salinity levels are low. DMF studies have shown that released speck survival is greatly decreased in low salinity areas, such as those occurring in coastal rivers and streams after rainfall events. The mortality of released fish can climb from 10 percent in high-salinity waters to 17 percent or greater in low-salinity waters.

Although salinity is important, cold weather is probably the major environmental factor that can adversely affect North Carolina's specks. Speckled trout, which many anglers consider coldwater fish because they typically fish for them in cold weather, actually reach the northernmost limit of their spawning range in Pamlico Sound. They are at their best in the warm waters of the Gulf Coast and other Southern locations. Therefore, cold stun events can have a severe impact and are the most likely cause of the decreases in the state's speck stock.

"From Virginia northward, spotted seatrout landings are only a fraction of what is caught in North Carolina," Burns said. "Cold stun events affect seatrout along the Gulf Coast as well. But being at the northern limits of their range, they are subject to more cold kills here than in states farther south."

Following the last confirmed cold stun event in 2003, the recreational harvest was the lowest it had ever been. But then a series of warm winters revitalized the fishery in both sizes and numbers. "Following the cold stun event in the winter of 2003, the recreational harvest was an all-time low of 145,936 pounds," Burns said. "But they recovered so much since then that in 2007, the recreational harvest had increased to an all-time high of 988,527 pounds. Top catches occurred in 1994, 1999, then every year since 2007."

Though some recreational anglers think commercial fishing has a big impact, that's not true. Burns said that during years when the population is high, both groups of fishermen compete in the same waters for the same

MIKE MARSH

TIM ELLIS

JAY FLEMING

The Cape Lookout jetty area (top) is a proven and very popular location for speckled trout. Fishing from kayaks has grown in popularity and is a good way to get close to specks.

speckled trout, which leads to conflicts. However, the recreational catch has gone through the roof while the commercial catch has remained static. Recreational anglers are simply becoming more effective.

Anglers have been catching super specks everywhere within the fish's range. But several locations have become legendary for producing big specks, such as the creeks entering the New River near Jacksonville and the jetties at Fort Macon, Cape Lookout and Wrightsville Beach.

Several of the guides I've fished with specialize in catching super specks. One is Capt. Dave Dietzler, who uses big minnow-imitating lures. "I use a traditional minnow imitation [MirrOlure 52MSHP]," Dietzler said. "The bigger fish go for the bigger lures, and they like bright colors, such as hot pink. One of my favorite places is the Fort Macon rock jetty."

Fort Macon State Park is the site of a restored civil war fort. A road leads to a parking area near the jetty. Anglers fish not only the jetty, but also from the extensive beaches on either side of it.

Dietzler fishes from a boat. The best time to catch specks can have some rough water conditions that make anchoring the boat and casting far enough into the wind to get the lure near the rocks a problem. At such times, he heads for the backwaters near Morehead City. The Thoroughfare, North River and Bogue Sound hold some big specks.

Another guide who fishes the Morehead City area is Capt. Jeff Cronk. He uses scented soft plastics (Berkley Gulp Shrimp) on jig heads when the big specks arrive at the Cape Lookout rock jetty. Cronk fishes from a boat, but the jetty can also be fished from the beach, following a ferry ride to Cape Lookout and a short drive in a four-wheel drive vehicle.

"The fish bite night and day when they arrive at the Cape Lookout jetty," Cronk said. "A scent-impregnated soft bait is my first choice. But as the weather gets colder, nothing works as well as a live bait."

Sometimes there are dozens of boats at the Cape Lookout jetty, making it hard to find a spot between them to anchor. There are lots of rocks, but only a few of them hold fish on any given day or night and the places the fish prefer change all the time.

"I catch mud minnows up in the heads of the creeks and keep them alive in a bait pen all winter," Cronk said. "I fish them with a No. 4 circle hook and use a split shot to take the mud minnow to the bottom. That itty-bitty circle hook can hold an 8-pound speck. You just have to let the fish move off with the bait and hook itself in the corner of the mouth. A circle hook really helps if you want to release the fish unharmed because a fish doesn't swallow it like it can a J-hook."

My lure has broken ice in the South River while I was fishing with Capt. Lee Parsons and Capt. Charles Brown. The two speck veterans prefer using the newest styles of suspending hard plastic lures.

"When it's cold, sometimes you have to wait for the fish to turn on," Parsons said. "The sun warms the water as it rises, so sunny days are best when it's cold."

"You cast the lure [MirrOlure 17MR808] to the points and grass edges," Brown said. "Reel it slowly to take up the slack, then twitch it and let it rest. Big specks are lazy when the water is cold. When the lure stops, they think they're getting an easy meal, until you set the hook."

Capt. Mike Taylor grew up on the New River. He enjoys catching specks using top-water lures (MirrOlure Top Dog or Zara Spook). But when the chips are down, he relies on a scented, minnow-shaped soft plastic lure (Berkley Gulp Pogy) on a 1/16-ounce jig.

"It's hard to hook a speck with a top-water lure, but it's incredibly exciting," he said. "Sometimes the fish strikes the lure three or four times before he hangs onto it long enough for you to set the hook."

If a big speck strikes and misses, Taylor is quick to cast a scented soft lure back in the same spot. The tail vibrates slowly as the lure falls then rapidly as it is twitched upward. The action imitates a dying baitfish falling to the bottom, struggling to stay up in the water column.

"A big speck can't refuse the easy meal," he said. "The scent helps attract the fish and the soft feel of the lure makes him hang on to it until you can set the hook."

Capt. Jot Owens has lived in Wrightsville Beach his entire life. When the big gator specks move to the Masonboro Inlet jetties,

he heads there in his boat. "When I was a kid, fishermen who could catch live shrimp in the winter were the real speck experts," he said. "That changed when a local seafood house started selling live shrimp. Another thing that happened was the introduction of enzyme-impregnated soft lures [Bass Assassin Salt-water Shad BLURP]. Anyone who uses them can catch big specks."

Incredible growth in the number of anglers living at the coast over the past two decades combined with better baits and lures has created a situation that puts more, and more effective, speck anglers on the water all year long, where once very few salty souls braved the wind-chilled chop. It is only within that same time frame that inshore guides have been able to depend upon having a clientele throughout fall and winter. These factors have played a big role in DMF's concerns about the state's speck stock and consequently the tightening of angling regulations.

While seatrout anglers have been having a heyday, they should not become lulled into believing that big gator specks will always be so abundant. Historically, there have been booms and busts in the speck population and past performance is the best indication of what the future likely holds.

The winter of 2009–10 was harsh, with an extended period of freezing conditions and reports of cold-stunned fish from several areas of Pamlico Sound.

Whether that cold weather had any residual effects remains to be seen. Only by looking backward at the recreational speck catch statistics will the true picture come into focus. Having five mild winters in a row between 2004 and 2009 could have been an anomaly, or it could be a lasting trend.

The only thing fishery managers can control with specks is fishing mortality, which they do through implementing harvest regulations.

"Management creates a buffer so that if you do have a catastrophic freeze, delays in the harvest of spotted seatrout allow those fish that survive to recoup a little faster, returning the big fish recreational anglers like to catch," Wilson said. "Ups and downs in the harvest statistics over the years show that it really is an environmentally driven fishery." ⬘

Wilmington writer Mike Marsh is a regular contributor to Wildlife in North Carolina.

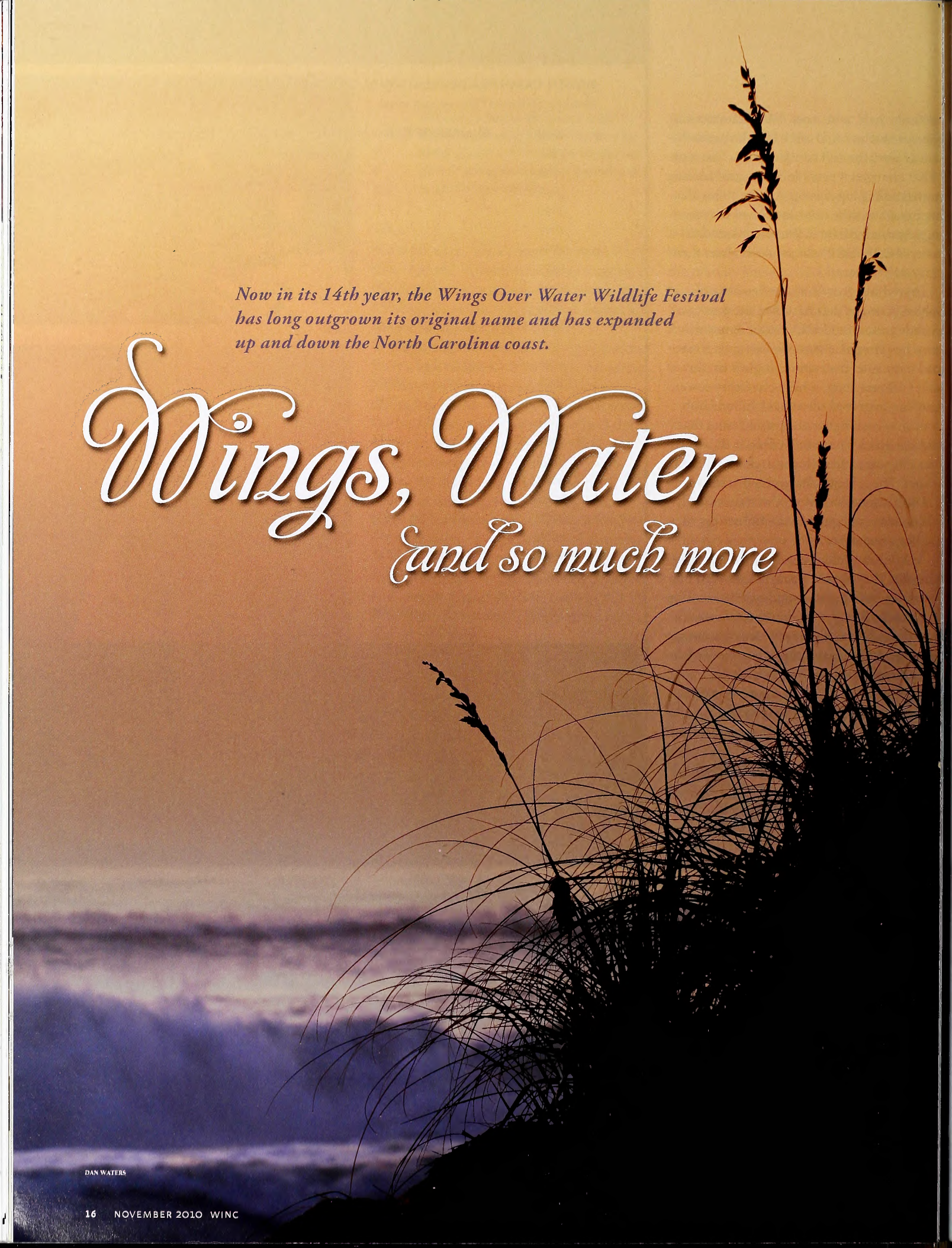
NORTH CAROLINA RECREATIONAL CATCH OF TROPHY SPOTTED SEATROUT

(Division of Marine Fisheries statistics)

YEAR	NUMBER OF FISH >24 INCHES	PERCENT OF FISH >24 INCHES
1987	0	0
1988	0	0
1989	431	0.34
1990	0	0
1991	521	0.16
1992	0	0
1993	674	0.33
1994	934	0.2
1995	2,445	0.75
1996	1,275	0.85
1997	0	0
1998	0	0
1999	1,906	0.46
2000	799	0.32
2001	0	0
2002	1,828	0.93
2003	548	0.58
2004	0	0
2005	1,240	0.24
2006	5468	0.95
2007	28,443	5.48
2008	7,221	1.24
2009	8,025	1.58
TOTAL	**68,394**	

Now in its 14th year, the Wings Over Water Wildlife Festival has long outgrown its original name and has expanded up and down the North Carolina coast.

Wings, Water and so much more



DAN WATERS

JEFF LEWIS

Written by Elizabeth Brownrigg

Every November, a flock of birders descends on the Outer Banks of North Carolina for the annual migration known as the Wings Over Water Wildlife Festival. In any one of dozens of adventures, you might peer through pine trees at dawn in search of the red-cockaded woodpecker, howl like a wolf and hear real wolves howl back, or stride across the windblown beach to the crashing surf. The instructors raise the curtain to reveal the secrets of the impenetrable forest and the shifting sands.

PHOTOS (LEFT COLUMN): RACCOON BY DAN WATERS, OYSTERCATCHER BY JEFF LEWIS, HUMMINGBIRD BANDING BY JEFF LEWIS, OSPREY BY NICK KOOPMAN; (RIGHT COLUMN): BIRDWATCHERS BY JEFF LEWIS, FROG BY DAN WATERS, HOODED MERGANSER BY PENNY KOOPMAN, PLOVERS BY DAN WATERS

The festival offers an array of wildlife viewing and education opportunities. Clockwise from top right: birdwatchers using spotting scopes, green frog, hooded merganser, piping plovers, osprey, a banding demo by Susan Campbell, oystercatcher and raccoon.

Look For One Thing; Find Many Others

John Hammond is a fish and wildlife biologist in the Ecological Services division of the U.S. Fish and Wildlife Service. He has led a group of birders to the Palmetto-Peartree Preserve on the Albemarle Sound. It's dawn, it's cold, my feet are wet, I'm completely happy. Our mission is to find a colony of red-cockaded woodpeckers, a remnant population from the days when broad expanses of longleaf pine covered the Coastal Plain.

"There," John says. High up the trunk of a pine tree, a male red-cockaded woodpecker obligingly shows himself, with single red streak and bright white cheek. As soon as John sets up the spotting scope, the woodpecker flies away. We track more birds with our binoculars and eventually one holds still long enough to be seen at close range through the scope.

Red-cockaded woodpeckers are endangered due to the extensive logging of their native longleaf pine habitat. This particular group, although adapted to loblollies, is still in danger as the trees, damaged by the salt water from Hurricane Isabel in 2003, are falling prey to pine bark beetles.

We look for one thing and find many others. Every leaf in the understory flutters, because the leaf is really a bird, or because the wind is blowing a real leaf. The birds are pine warblers, yellow-rumped warblers, golden-crowned kinglets. John is an expert who is able to identify a species from a tiny movement. "There's a pine warbler," he says of one bird, indistinguishable to me. "How do you know?" I ask. "See how it's eating the apex of new growth in the pine needles?" he replies. The forest is filled with a thousand clues to a thousand mysteries. It's all in plain sight. It's all hidden.

The sun climbs higher and we drive to the broad fields of the Alligator River National Wildlife Refuge.

PHOTOS (CLOCKWISE): GOLDEN-CROWNED KINGLET BY JEFF LEWIS, PINE WARBLER BY JEFF LEWIS, RED WOLF BY MELISSA McGAW/NCWRC, HUMMINGBIRD BANDING BY JEFF LEWIS, HUMMINGBIRD BY JEFF LEWIS, BLACK BEAR BY JEFF LEWIS, YELLOW-RUMPED WARBLER BY DAN WATERS, RED-COCKADED WOODPECKER BY JEFF LEWIS

Clockwise from top left: golden-crowned kinglet, pine warbler, red wolf, banding a hummingbird, the same hummer after banding, black bear, yellow-rumped warbler and red-cockaded woodpecker. Below: Herbert C. Bonner Bridge.

A column of black vultures spirals upward. Nothing notable there, so my attention wanders. "Look," John says. I examine the column more closely. There's a bald eagle circling with the vultures. The extraordinary is hidden in an ordinary cloak.

Houses Built On Sand

On a bright, windy afternoon, a small group of us walks across the sand at the north end of Hatteras Island with Jan DeBlieu, Cape Hatteras Coastkeeper, and expert on the effects of winds and tides.

We stand at the edge of Oregon Inlet. The Herbert Bonner Bridge carves a graceful arc through the blue sky from the mainland to Hatteras Island. It looks as though the inlet has always been here.

Oregon Inlet was cut by a hurricane in 1846. Along with white settlement came permanent things, such as roads and houses and the seafood factory in Wanchese that depends on the fishing boats that travel through the inlet. Bonner Bridge was constructed in 1963 to link Hatteras Island to the rest of the world.

Jan points out the big chunks of gray granite that certainly did not originate here. Because inlets move south naturally, the north end of Hatteras Island is eroding just as the south end of the mainland is building up. The blocks are preserving the south side of the inlet as was intended, but the north side is moving ever southward, so the inlet is growing narrower and the waters that course through it are growing swifter. The swifter current is undermining the bridge pilings.

We walk across the blowing sand from the inlet towards the Atlantic Ocean. There are chunks of asphalt in the sand, signs of the previous locations of N.C.12, the main road on Hatteras Island. Because the island is moving ever westward, and because storm waves wash away the road, Route 12 has had to be built again and again.

We pass three rows of tall dunes that were constructed from the 1930s to the 1950s in an attempt to keep Hatteras Island, and N.C. 12, intact. The Outer Banks are naturally flat and low; wind and waves push them westward. The dunes have stopped

DAN WATERS

this process, so that now the waves dredge out the bottom of the dunes and wash some of the sand back into the ocean. The island grows smaller and narrower. The Outer Banks are a topsy-turvy world of reverse magic, where the result of every action is the opposite of its intent.

We reach the edge of the Atlantic. The surf is churned into a froth in which, improbably, a small group of ducks bobs. They ride up and down in the sweet spot between the breakers and never get doused by an oncoming wave.

Invisible Fliers

Not far from the white sands and crashing surf of Oregon Inlet are the neighborhoods of Manteo, a world apart of green lawns and sheltering trees. In this particular yard there is a crowd of onlookers who have followed Susan Campbell in hopes of seeing her band a hummingbird. The yard is a very bird-friendly habitat, with untrimmed bushes and trees providing food and cover. The only odd note is a large wire cage around the hummingbird feeder.

We settle into lawn chairs. Susan creeps behind a bush and holds a long string that's attached to the open door on the cage. We wait, but not for long. A dot zips into the cage, and clang! the door is shut.

You can tell an experienced animal handler by the sureness of her actions. Without a moment's hesitation, Susan reaches into the cage, picks the hummingbird out of the air, and covers it with a fine white cloth. She brings it out to the waiting crowd and unwraps it.

The bird lies still in her hand. Concerned audience members ask, "Is it all right?" Surprisingly, hummingbirds are very calm when caught, much calmer than, say, cardinals. This is a male ruby-throated hummingbird. In the right light, its throat glows reddish-purple. You can even identify the birds' gender by the sound of their flight: The male wingbeat sounds different from the female's; it is a higher-pitched whir because the wing feathers are shaped differently.

Then Susan blows through a straw onto the bird's breast. The feathers part to reveal the rapid movement of breathing under naked skin. The hummingbird has no feathers there so that it can be cooled during the hard work of flying.

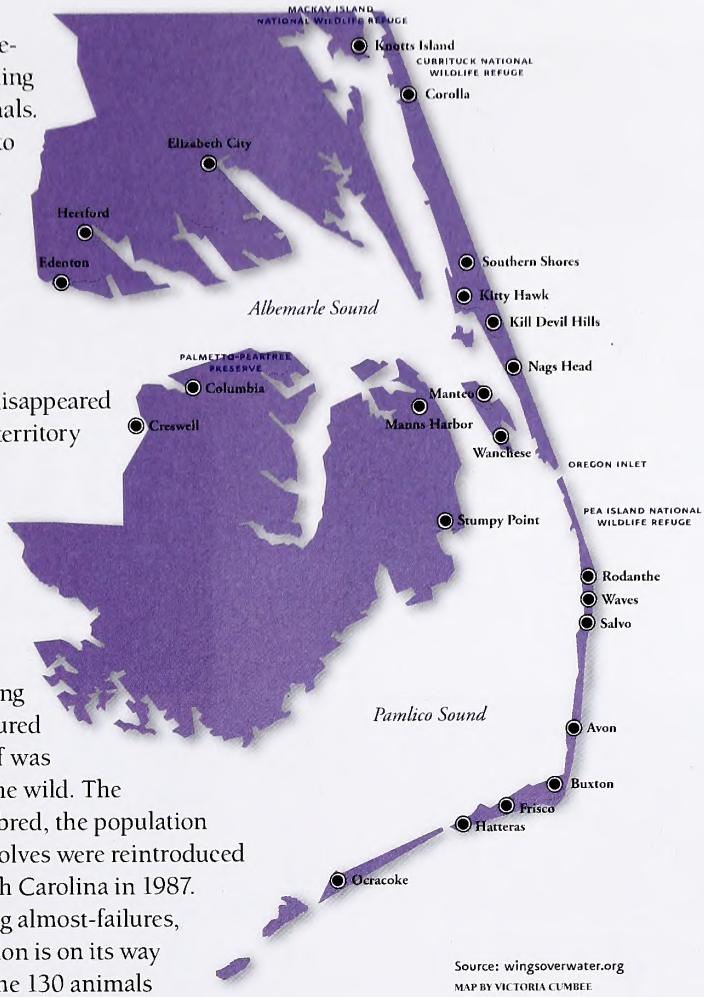
Susan places our thoroughly examined bird into the palm of a little girl. She, and we, all hold our breaths. The hummingbird is very still. Suddenly it is gone, just a little dot zipping over the trees.

In The Forests of the Night

U.S. 64 from Raleigh to Manteo passes the Alligator River National Wildlife Refuge, which from the highway looks like a ditch along the road, and then a green wall of trees and underbrush. Despite the yellow warning signs that promise bears, I'd never spotted anything larger or livelier than turtles sunning on the logs in the canals.

Sometimes it has to get dark before you can find anything. At sunset, I join the Red Wolf Howl, led by Kim Wheeler, executive director of the Red Wolf Coalition.

The red wolf has disappeared only to reappear. Its territory used to extend over the southeastern United States, from Maryland to Texas. With the species exterminated by hunters and habitat loss, the last remaining population was captured in 1980 and the wolf was declared extinct in the wild. The captive wolves were bred, the population increased, and red wolves were reintroduced to northeastern North Carolina in 1987. After some harrowing almost-failures, the red wolf population is on its way back to survival. Some 130 animals now roam the 1.7 million acres of the Alligator River National Wildlife Refuge, Pocosin Lakes National Wildlife Refuge and Mattamuskeet National Wildlife Refuge.



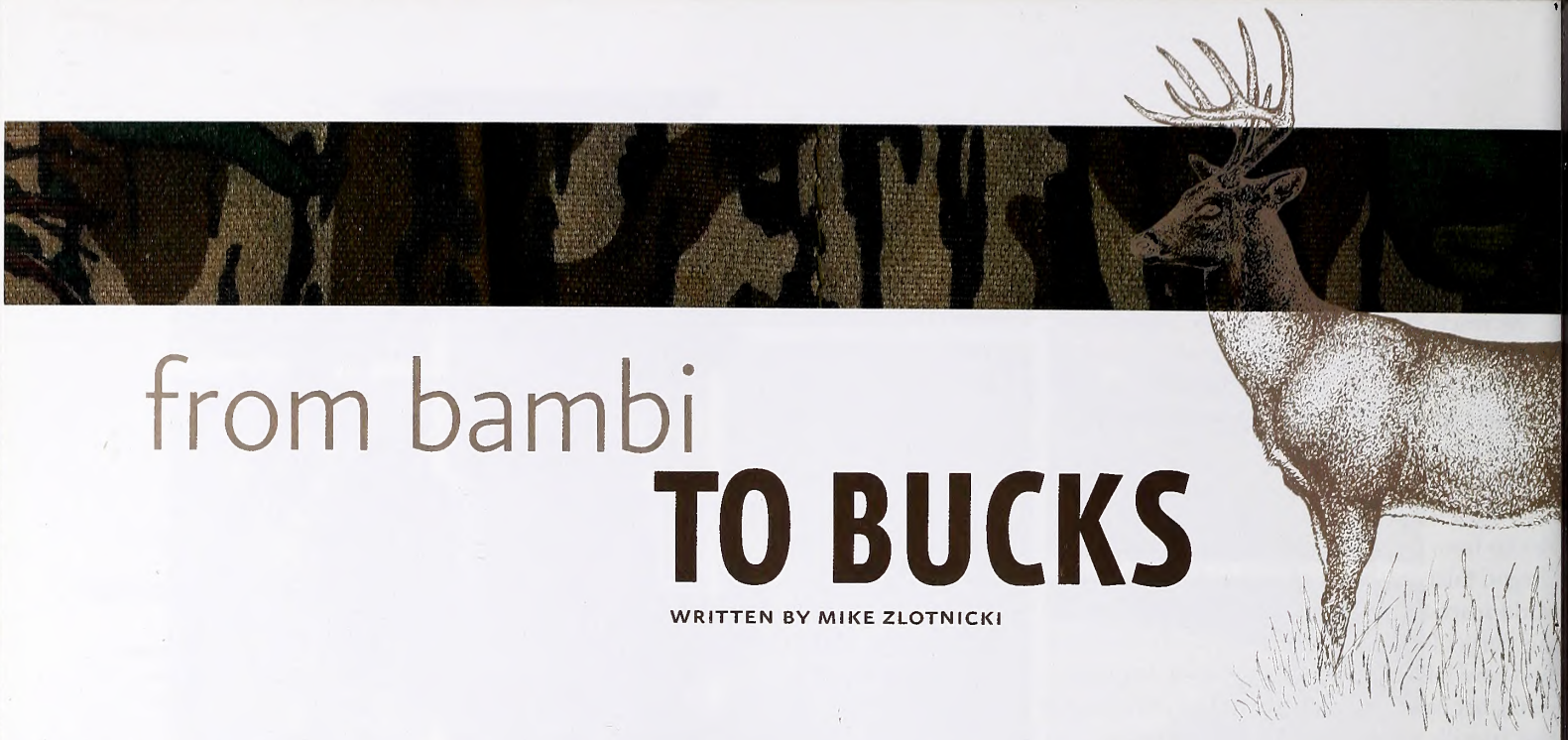
Kim leads a caravan of cars over 5 miles of dirt roads into the Alligator River National Wildlife Refuge. We arrive at a caretaker's house in the middle of deep dark woods. Farther back in the forest, Kim tells us, are captive wolves, kept in pens because they're injured, or they're being prepared for introduction into the wild. "The first howl you hear will be me," she says. "I don't know if this will work. They don't always respond."

She disappears into the darkness. We hear a howl that sounds very much like a wolf howl should sound. That must be Kim. Then there is a chorus of howls that are clearly not Kim. High-pitched howls (wolf puppies), deep howls (wolf adults), a wall of sound that takes us back to when our own ancestors roamed woods like these and heard haunting sounds like these. Kim returns to the group, very excited. "I've never heard this response before." She encourages us all to howl, and we do so with unfettered gusto. The wolves howl back, saying, "We are here. We are here. We are here."

Elizabeth Brownrigg is a Durham writer and an occasional contributor to WINC.

To find out more and to register for the 2010 festival, visit the WINGS OVER WATER *website,* **www.wingsoverwater.org**; *e-mail* **wow@coastalwildliferefuge.com**; *or call* **252-216-WING (9464).**

DAN WATERS



from bambi TO BUCKS

WRITTEN BY MIKE ZLOTNICKI

RUSSELL GRAVES

MIKE ZLOTNICKI

Introducing a child to deer hunting is an inexact science that must be tailored to the individual. **However, the work can be worth it in a big way.**

You could have knocked me over with a feather last spring when my oldest daughter Caroline told me she wanted to go turkey hunting on Youth Day. After weeks of preparation—gun safety, turkey habit study, calling practice, gear acquisition—we had a great first hunt without killing a bird, topped off by chicken and biscuits on the way home (another first). Now she wants to go deer hunting. This one is a little trickier.

Happy hunters, young and old (from left): Ryan Graves, Caroline Zlotnicki, Keith McCafferty and Tom McCafferty.

COURTESY OF McCAFFERTY FAMILY

Teaching children to look for animal signs such as tracks and rubs is a good start to raising a confident young hunter such as Taylor Thomas (right).

It may sound oxymoronic, but though you don't have to kill to say you've hunted, **there's still nothing more natural in this world than killing and eating an animal.**

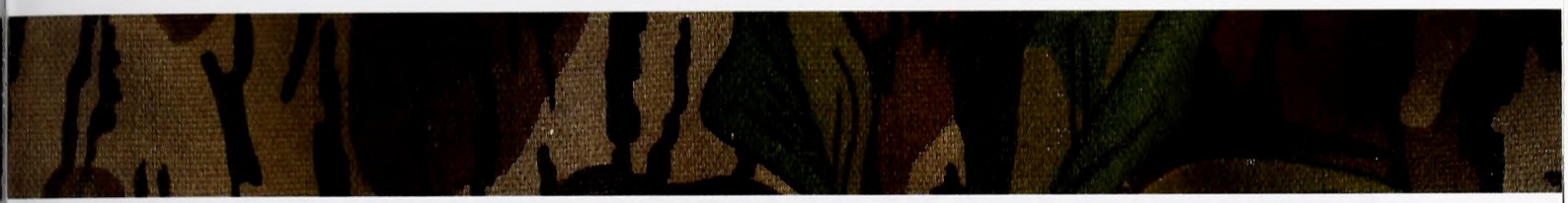
Young minds are exposed to anti-hunting messages almost from birth. Disney has cast the hunter as a villain in "Bambi" (must have been doe season), "Beauty and the Beast" (antagonist Gaston is a hunter and letch), and "Snow White" (at least he killed a pig instead of the star). Children are inundated with television fare such as Animal Planet and "Zoboomafoo" with personified animal hosts, and I've yet to hear the talking lemur espouse hunting.

Back in the day, my introduction to hunting was a freezing pheasant hunt somewhere west of Omaha, Neb. It was rough trekking for a 5-year-old kid, but when Dad shot a rooster and beat a setter to the retrieve, I was hooked. When we moved to South Carolina, we started to hunt deer, but there weren't very many in the '70s, and we weren't real skilled. A "successful" deer hunt meant seeing one, usually through the window of our Volkswagen bus, and usually that bouncing backside and white tail as the animals vacated bean or fallow fields on the state forest we frequented.

Times are different now, and since my oldest daughter has expressed an interest in deer hunting I want to expose her to it in the best possible fashion. She's fished since she could walk and has no problem killing a fish, and we talked about the chance that if she pulled the trigger on a gobbler, it might die. But deer are mammals with big brown eyes, and they leak when they have holes in them, something fish and birds aren't as prone to do. As much as I want Caroline to embrace deer hunting in terms of protein acquisition and quality time afield, I fear that the total ownership a hunter has in killing game might put her off. One can choose not to pull the trigger, but there's no catch-and-release in hunting, unless you use a camera, and you can't eat pictures. It may sound oxymoronic, but though you don't have to kill to say you've hunted, there's still nothing more natural in this world than killing and eating an animal.

But how do you convey that to a child? I talked to three hunters who are fathers — two in the Tar Heel State and one in the Big Sky State — to get their thoughts.

Chris Douglas of Lemon Springs is a freelance videographer who's followed the likes of Tom Miranda, Michael Waddell, Jim Shockey, and Lee and Tiffany Lakosky around



the planet. His early experience as a hunter helped shape his plans for his son Hayden.

"It was everyone for himself back then," recalled Douglas. "There weren't many deer. They'd say 'go up that tree' and there were some 2-by-4s leading up to a 2-by-6s pereh. My boots were my Dad's tennis shoes stuffed with socks. I remember crying up in a stand. It's a wonder I even want to deer hunt now."

He killed his first deer at age 11 after three years of trying. He took Hayden on his first deer hunt at 4. "I didn't stick him up in a tree," he said with a laugh. "His momma wouldn't put up with that."

Instead, Douglas hunted a terraced field, placing Hayden on a sleeping bag behind a weed row to play with toys or nap while he waited for deer. "I didn't see any deer, but he didn't get bored," said Douglas, "and I wanted him to be imprinted with good experiences. There's just too many other things tugging at kids these days."

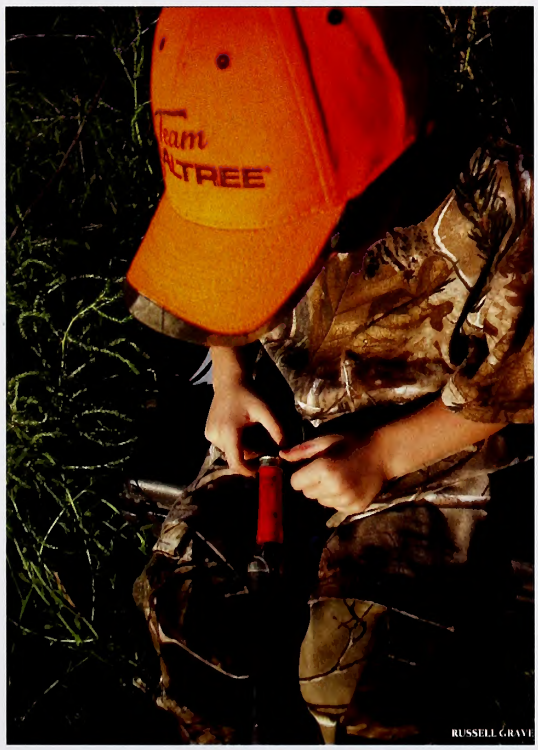
Four years later, in Chatham County, Hayden used a Thompson/Center Encore single shot in 7mm-08 to take a three-pointer right after Douglas returned from a video shoot in Texas. The pair sat in a ground blind and talked about various nonhunting topics, but also practiced hunting scenarios such as mounting the gun and holding it steady. When the buck stepped into the lane 67 yards away, Hayden was ready. Douglas said that the pair's reaction was a "heavy mix of accomplishment and ownership. It's more than a ball game, hitting a home run or scoring a touchdown."

Hayden said there was little downside to the event. "I was excited, happy," he said. Did he feel remorse? "Not really, his time was coming anyway."

Douglas' advice for parents is to think long term: "Make every experience positive," he said. "My Dad and I had blowouts on other issues, but hunting wasn't one of them. We shared that. Hayden may end up more of a bird guy, and that's fine. Not everyone is going to be a big-game hunter.

Douglas noted something that made an impact on me the first time I saw it: the damage a bullet does to flesh and bone. "We had a chance to see what a bullet does to an

MELISSA McGAW / NCWRC



RUSSELL GRAVE

The author spends time well before the hunt teaching his daughter Caroline about firearms and other important aspects of hunting.

RUSSELL GRAVES

MASLOWSKI WILDLIFE PRODUCTIONS

The goal of your hours of hunting preparation with a child is that when the time to shoot comes, the youngster will be mentally and physically ready to pull the trigger.

animal," he said. "It put the fear in me as a child. It's real."

John Gasiorowski of Apex raised daughter Amanda, 24, and son Will, 30, to be deer hunters. Amanda started sitting in her father's lap in a tower stand when she was 7 years old. One day she leaned forward and saw a doe and whispered, "Kill it, Daddy."

"I knew I had her then," said Gasiorowski with a chuckle. Amanda killed her first deer — two deer, actually — in December of 1999. Gasiorowski wrote a missive for Buckmaster magazine describing the experience. In the story, he wrote, "As I looked at Amanda while going to the truck I noticed a quietness and sadness of killing two beautiful animals. As we talked through it she understood her feelings were natural and [she] probably would have the same feelings with future hunts when she harvested any legal wildlife."

"If they shoot to please you, they don't need to be hunting," he said.

Amanda has now taken up bowhunting, and Gasiorowski believes early introduction to guns and shooting is an important part of the deer-hunting process, started at first by creative target shooting. "We shot cardboard silhouette targets with heart, lungs, liver and kidneys outlined," he said. "We highlighted the areas she needed to shoot at."

Another value of the targets that carried over to field dressing and butchering was the study of anatomy. Cardboard examples became real-life examples in the field.

Weapon familiarity and confidence were also things Gasiorowski preached.

"Teach them not to doubt themselves," he said. "When you pull that trigger you're in charge of that gun; it's not in charge of you."

If you read *Field & Stream* magazine, you probably know who Keith McCafferty is (hint: survival editor). He's a 1975 graduate of Duke University and has a passion for big-game hunting. He also introduced a child, his son Tom (now 28) to hunting, and along the way penned two articles on the subject. "I never forced him to hunt. I never even really suggested it," said McCafferty from his Bozeman, Mont., home. "I wanted to introduce him to it slowly."

So young Tom followed McCafferty on hunts for elk, mule deer and whitetails, with the father making sure to kill a doe to expose his son to a potential end result. When Tom

"Teach them not to doubt themselves. When you pull that trigger you're in charge of that gun; it's not in charge of you."

was 12 he was old enough to carry a gun under Montana law. Tom passed up several deer with his Remington Model 7 until one day. "He kept passing up shots until one day in the Bridger Mountains he shot, it ran off, and he started to cry because he thought he wounded it," said McCafferty. They found the deer and McCafferty recalled his son handling the antlers and stroking the fur. Today Tom is a chef, writer and artist, and still hunts.

The soft-spoken McCafferty advocates taking kids at a young age and attending hunter education classes. "I exposed him to the whole process of hunting through me without any pressure on him," he said. McCafferty also had an interesting observation. "You don't always know what makes them [children] afraid," he said. "I hunted with one young hunter who was afraid of the cows in the field we crossed."

That's a good point and one many men —often less sensitive than the moms—often don't think about. What may be common to you, veteran of many days afield, might be completely foreign to your child, especially in dark and unfamiliar locales. Dew-coated weeds that stop at your boots can soak shorter pants legs. Throw in some vocal coyotes, cold rain or distant owls, and things can get dicey fast. Step amid a covey of predawn quail underfoot, and a change of clothes might be in order.

Caroline and I will hit the deer woods this fall and see what happens. She's got some turkey hunting behind her, and we'll practice the deer stand scenarios and partner in gear selection. In time there will be a .243 or 7mm-08 with her name on it if we get that far. I don't think she'll shoot this year, but I want her to enjoy the ritual of it and maybe I'll kill a deer for her when she's with me. Maybe I won't; I'll make that call at the time.

We'll spend time together, communicate and partner in the process. She'll strive to act mature, and I will do my best to think like a kid. And above all, we'll have fun, venison or not. ◆

Mike Zlotnicki is the former outdoors editor for The (*Raleigh*) News & Observer. *He lives in Garner with his wife, three daughters and a German shorthaired pointer.*

PROPER PREPARATION

There are more than a few things to consider to make the deer woods a positive experience for children, starting with proper clothing and equipment.

Pleasant weather is easy to dress for, but for cooler temps make sure the child has wool or wool blend socks, boots that fit (insulated boots for colder weather) and camo clothes and jackets that fit. Getting them involved in the gear selection process promotes unity and gives them some ownership in the hunt.

Stand selection is another often overlooked area. A big tower stand is ideal, but make sure the child isn't intimidated by the climb. Inside, a rug helps deaden the inevitable scrapes and thumps of boot soles and gear. The walls obviously help with scent control and movement masking. Don't overlook a big ground blind for the same reasons. Easy ingress and egress, and commercial pop-up ground blinds are portable, lightweight and inexpensive. They allow for naps, book reading and (sigh) portable video games during long waits. (Remember, they have to have fun if you want them to return.) Don't forget snacks (foil wrap and zip-loc bags are quiet) and drinks. For modest hunters, bring a bucket, trash bag and toilet paper for the Call of Nature. If the child is the gunner, a shooting stick (rest) of some type is a good idea.

Two-man ladder stands are nice, but make sure they have a cloth skirt for more camouflage and movement protection. Facemasks are de rigueur for woods hunting, but face paint is more fun to apply and generates less movement and fidgeting.

ILLUSTRATION BY DAVID WILLIAMS

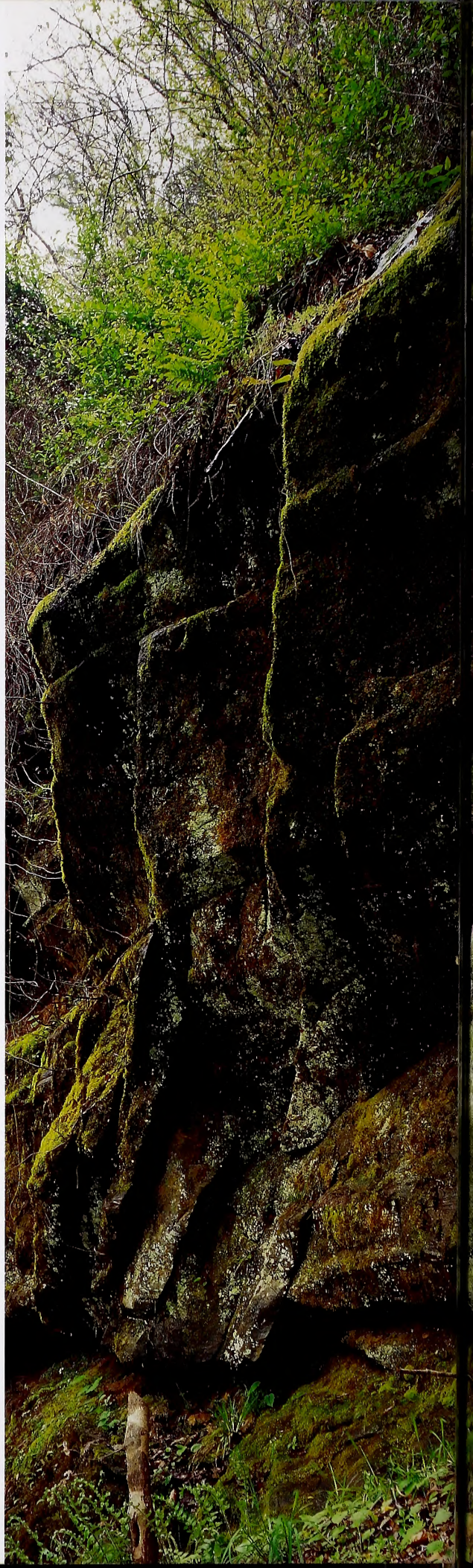
The WALL on the CAPE FEAR

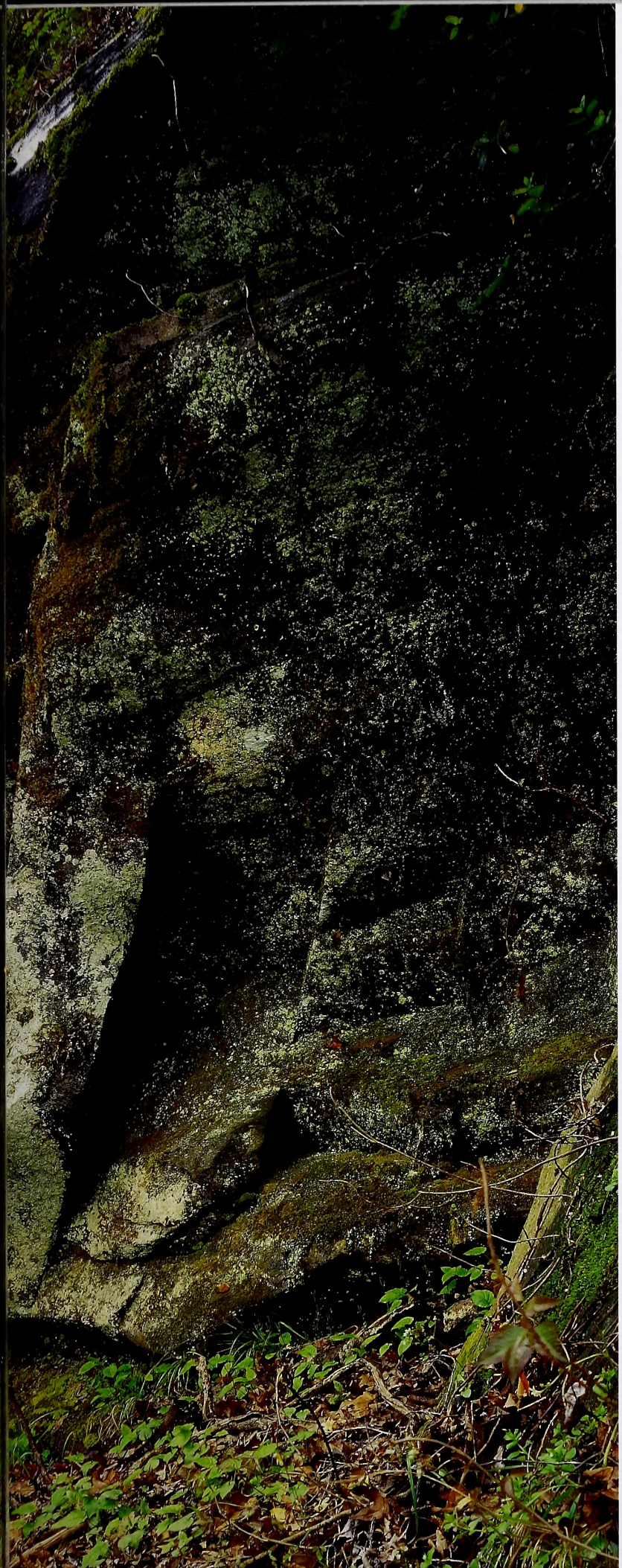
The Cape Fear River's
FALL LINE RAPIDS
blocked commercial traffic for much of the 19th century,
defeating the best human efforts to overcome them.

Near Erwin in Harnett County, the N.C. 217 bridge provides a convenient spot from which to gaze at the Cape Fear River. On a warm May afternoon, the view is a pleasant one, with the river threading its way slowly through a maze of exposed rock, creating a rush of small runnels and rapids. Some of the rocks are large enough to function as small islands, supporting a few leafy hardwood trees. A kayaker might have fun with a couple of Class II rapids, but for the most part the river slides by in silken murmurs.

It's hard to believe that one of the great battles of North Carolina history was played out along this peaceful stretch of river. It was not a Civil War battle or a battle between Revolutionary War redcoats and patriots, but it was a battle in every sense, involving formidable opponents, gunpowder and feats of great ingenuity. And as in all battles, there were momentary successes, sudden reversals and ultimately, for one side, a great and humbling defeat.

WRITTEN AND PHOTOGRAPHED BY
LAWRENCE S. EARLEY





The time setting was the early 19th century. And the opponents? On one side, several generations of North Carolinians who wanted an unobstructed passage up and down the river to transport their goods to market. On the other, rock: the very rock you see below the bridge, obdurate and stubborn rock, the kind that might block a boat from proceeding upstream or spill a raft loaded with farm produce or naval stores. For many settlers along the upper Cape Fear, the rapids here and elsewhere along the river loomed like the Great Wall of China.

The rocks and rapids viewed from the 217 bridge have a name. They are called Smiley's Falls, although as the highway marker on the northern side of the bridge informs us, Smiley's Falls is really a series of rapids that stretch upriver for at least a mile and a half. Many of these rapids have their own names —Narrow Gap, Smiley's Falls, Campbell's Falls and, ominously, Killing Falls. And beyond the last of the Smiley's Falls rapids lie more named falls—Atkins' Falls, McAlester's Falls, Small's Falls, Turner's

The hard crystallized rocks of the Piedmont (left) meet the softer sedimentary rocks of the Coastal Plain along the fall line, creating rapids (top) in rivers such as the Cape Fear.

To Tame A River

From Cross Creek upstream to Hancock's Mill in Moore County, 19 dams were built on the Cape Fear in the 1850s. The dams were intended to make the river navigable by lifting ponds of slack water above the rocks.

The old town of Haywood was once considered as the state capitol and site of the university. The Cape Fear's rapids foiled plans, however, and the town gradually disappeared.

Many Highland Scots who settled on the upper Cape Fear River used the technology of their native land to construct fish traps in the rapids.

A major road from Fayetteville to Raleigh once crossed the Cape Fear River at a place called Northington Ferry. It took 20 minutes to cross the river and operated until 1920. The road passed through the site of Raven Rock State Park.

Raven Rock State Park lies on both sides of the Cape Fear River. Raven Rock itself was a major landmark for rafters and others who traveled by river.

Just above Smiley's Falls, timber rafters often engaged local guides to pilot their rafts through the maze of dangerous rapids.

Smiley's Falls was one of the most dangerous set of rapids on the Cape Fear River. To extend navigable water above Smiley's Falls, four dams were erected in the 1850s: Haw Ridge, Green Rock, Big Island and Sharpfield.

Old Averasboro was a populous town in the 18th and 19th centuries. It was the high point of navigation for pole boats going upriver. Rafters floating logs downstream stopped here to reassemble their rafts after negotiating Smiley's Falls. Farmers in the upper Cape Fear basin brought their goods to Averasboro for transport downriver to Fayetteville and Wilmington.

CAPE FEAR MUSEUM

Above: Smiley's Falls. Right: A hand-tinted engraving of Wilmington in 1853.

MAP BY VICTORIA CUMBEE

Source: Wade H. Hadley Jr., *The Story of the Cape Fear and Deep River Navigation Company 1849–1873* (1980).

Falls, Shaw's Great Falls, Rand's Falls, Northington's Falls, Lanier Falls, Battles Falls and, farther upriver, Buckhorn Falls.

Geologically, these rapids are part of a story that began hundreds of millions of years ago when North America and Africa bellied up to each other. The force of the collision between these massive continents pushed up the ancient Appalachians to a height of more than 20,000 feet, and higher in some spots. In time—that's geology-speak for about 75 million years—the suture between the two continents gradually parted, the two went their own ways and our Himalaya-sized mountains began to erode. They are eroding still today. Rivers—including an ancient Cape Fear—carried the fragments downslope, depositing them in a vast coastal plain at the ocean's edge. The plain grew in a wide and deep wedge: You'll find Appalachian sediments 30,000-feet deep along North Carolina's offshore margins, and 10,000 feet deep at Cape Hatteras. Over an unimaginable timescale, erosion built an upside-down mirror image of our ancient North Carolina Himalayas out of a mountain of sediment!

Smiley's Falls and the other rapids on the Cape Fear rapids lie at the western margin of these deposits. Upstream is the Piedmont with its corrugated landscape and fertile soils. Downstream, below Erwin, is the flattened Coastal Plain with its pine forests, sandy soils, meandering rivers and low swamps. The rapids announce that we're straddling these two provinces, a boundary area geologists call the Fall Line, although it's not the kind of line that you can hop across. Let's call it the Fall Zone.

THE FALL ZONE

The Fall Zone is where the soft sedimentary rock of the Coastal Plain meets the hard, crystalline rock of the Piedmont. It's a momentous encounter and things happen as a result—Smiley's Falls, for one. The ledges of hard rock that you see from your perch on the N.C. 217 bridge are Piedmont rock, which is more resistant to the erosive power of the river than the softer sedimentary Coastal Plain rocks. As the river carves down toward sea level, it wears away the softer Coastal Plain rocks, leaving the harder rocks high and dry, so to speak, and creating rapids and waterfalls.

This doesn't happen only on the Cape Fear. You'll find similar rapids and waterfalls on the Tar, the Neuse and the Roanoke, and still others on rivers as far north as New York, as far south as Alabama. Connect the dots and you'll find some large cities—Augusta, Ga.; Columbia, S.C.; Richmond, Va. Once you connect the dots you have a wavy, irregular line paralleling the coast, although the word "line," of course, is a bit imprecise. It's a zone or a belt, really, where Piedmont rock and Coastal Plain rock are interlaced like the fingers of two lovers. The zone is irregular at best, sometimes very narrow and in other places up to 20 or 30 miles wide.

By the early 19th century, enterprising settlers had already flooded into the upper Cape Fear River valley, with its fertile soils and broad forests. Farmers with wagonloads of cotton, flour and naval stores were bustling to the river town of Haywood, near the confluence of the Deep River and Haw River, the Cape Fear's sources. The Endor Iron Mine and the Egypt Coal Mine were located higher on the Deep River and were looking for a means of getting their products to Fayetteville, more than 100 miles downstream, and Wilmington, even farther. But between these venues and the downstream markets lay a gauntlet of rapids that blocked easy passage year-round.

Calls for eliminating these obstacles rose up in the 18th century and continued into the 19th. "The first object of the Legislature in the system of Internal Improvements, is to render our Rivers navigable, that the Farmers may have a water carriage for their produce," urged state senator Archibald DeBow Murphey in 1819. Several piecemeal attempts were made to blow up the rocks using explosives, or to bypass them using canals. Neither method was successful. Finally, in 1849, the formation of the Cape Fear and Deep River Navigation Company signaled a systematic

NORTH CAROLINA ARCHIVES AND HISTORY

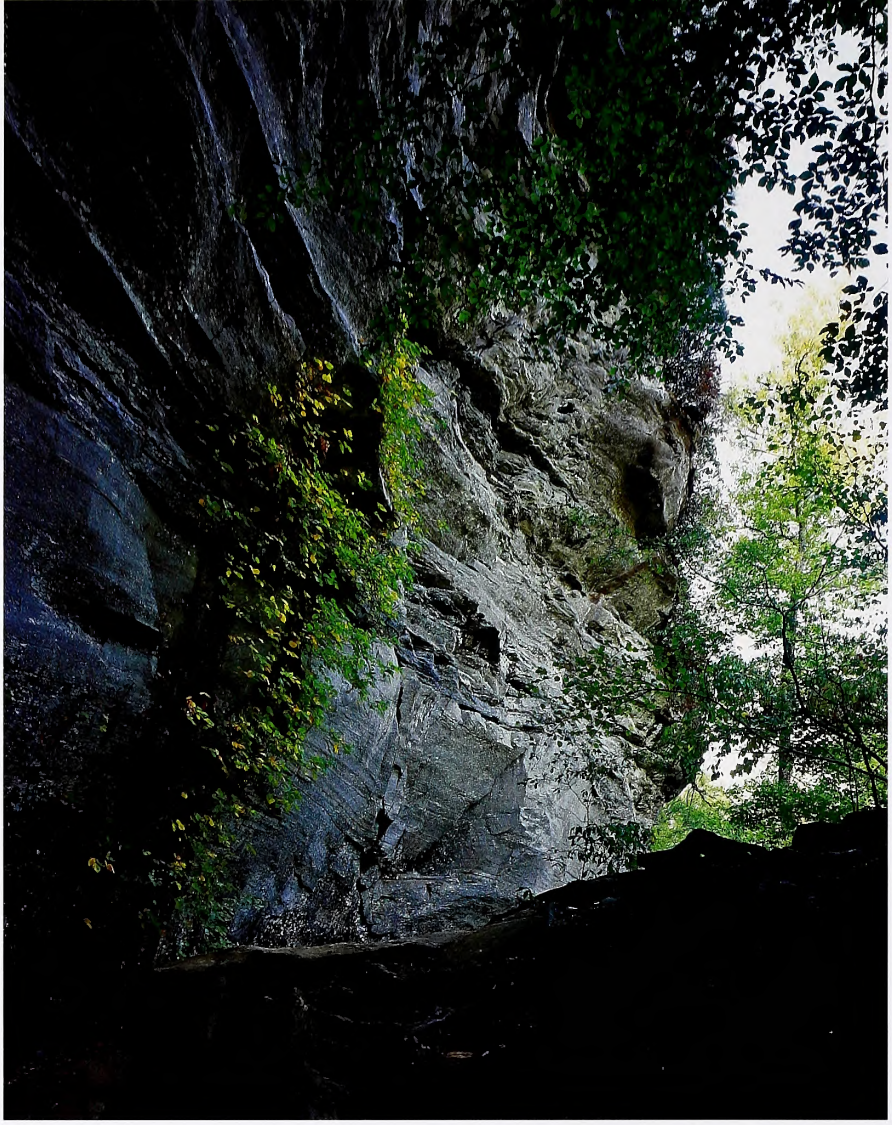
CAPE FEAR MUSEUM

NORTH CAROLINA COLLECTION

There were multiple methods of moving goods on the Cape Fear, from ferries (top to bottom) to steamboats to floating rafts of timber down the river.

"The first object of the Legislature in the system of Internal Improvements, is to render our Rivers navigable, that the Farmers may have a water carriage for their produce."

–State Senator Archibald DeBow Murphey, 1819



Raven Rock State Park (above) is situated near the former Northington lock and dam. An old cemetery is all that remains of Averasboro, once the third-largest town on the Cape Fear until the Southern Railway bypassed the town, sealing its fate.

attempt to make the Cape Fear navigable between Fayetteville and Hancock's Mill, 98 river miles upstream.

The company's solution was ingenious: lift the river into many quiet-water ponds by means of interlinked locks and dams, 19 in all, on each major set of rapids. The ponds created by these dams were intended to stretch from one dam to another. For example, the dam at Northington's Falls, in today's Raven Rock State Park, created a pond that stretched upriver 3 miles to the dam at Battles Falls. The dam at Battles Falls created a pond that went upriver another 3 miles to Buckhorn Falls. These ponds would enable a farmer to float a raft of goods over the rocks and permit a 100-foot steamboat to reach Hancock's.

By 1855, most of the crib dams were completed. "Who will not rejoice at the bright prospect that is opening up to us in the future," exclaimed one booster in 1853. "Who can fully estimate the immense benefits that will flow from this work when done!"

And for a while, success was tantalizingly close. The steamboat *John H. Haughton* even reached Haywood in 1855, but troubles were never far away.

The dams needed constant maintenance, and in the raging floodwaters of 1859 they failed extensively. They failed again in 1865 during what was called Sherman's Fresh, a mocking reference to the depredations of the Yankee general then taking place in North Carolina. In Malcolm Ross's colorful words in his book "The Cape Fear": "In that spring of 1865 all the rivers of the Southern coastal plain were swollen with unrelenting rains. The Haw and the Deep gathered to themselves the piedmont rains and brought them clashing together at Mermaid Point [where the Cape Fear began]."

Here the two rivers joined and flooded downstream, "smoothing out all trace of canals, locks and dams."

By then, ironically, it didn't matter much. By the 1860s, the "bright prospect" was glittering elsewhere. Railroads were already crisscrossing the state, and one of them, the Fayetteville and Western Railroad, eventually connected the iron and coal mines on the Deep River to the coastal ports downstream. As steel tracks were laid down through the

In dark greens and bright yellows, the painting was dominated by a field with grazing cattle, a pond and a line of forest in the background. There were two houses in the scene, whose owners he named, and traversing the canvas was a dark road in brown that led to an opening in the forest which he had painted in blue to suggest the Cape Fear River. On the right, lit by a morning or afternoon sun, were a couple of dozen headstones in the small cemetery where the long dead of Averasboro lay in their eternal rest.

R.L. Hamilton painted this scene of Averasboro as he remembered it in his youth.

forested spaces of eastern North Carolina, river boosters licked their wounds and gradually turned away from the rivers as a chief means of transportation. The Fall Line rapids — that geological boundary between the Piedmont and the Coastal Plain — had proved too difficult an obstacle to overcome.

MAN vs. GEOLOGY

Not much is left from this era of river improvements. At Raven Rock State Park, you can see a few remnants of the Northington lock and dam, although not enough to give any sense of the scale of the endeavor. The town of Haywood in Lee County, which had such high hopes, has not fared well either. Its presence at the junction of the Haw and the Deep rivers made it so attractive that it was one of two candidates for the site of the state capitol in 1788. It was even considered for the site of the new state university. If the dams had held, today's Tar Heel athletic teams might be playing for the University of North Carolina at Haywood.

At the other end of the Fall Line rapids, just below the town of Erwin, was the old town of Averasboro. Larger than any other town on the river except for Wilmington and Fayetteville, it was the head of pole-boat navigation on the Cape Fear and a destination for farmers bringing produce and naval stores downstream to be loaded onto boats for the passage to Fayetteville or Wilmington. Averasboro was where the timber rafters reassembled their rafts after guiding them, a single unit at a time, through the torturous rapids. There were a grist mill, a turpentine distillery and a ferry. But the failure to circumvent the Fall Zone rapids before the development of the railroads weakened this town as well. Its fate was sealed by the end of the century when the Southern Railway laid its line through Dunn, ignoring the old town.

One spring afternoon, I drove from the N.C. 217 bridge to look for evidence of old Averasboro. It still appears on the North Carolina highway map, and so I thought it was worth a look. I went first to the Averasboro Battleground, just a few miles from the site of the town, where in 1865 Confederate troops met Sherman's Union brigades and delayed their advance. I was told that I should talk to a man named R.L. Hamilton, who had grown up in Averasboro. I went to his business, Hamilton's RL Mobile Home Park, where I asked for directions to his home. "Down the road!" shouted a woman through her open door. "You can't miss it — it's the only brick house on the right. Under a grove of trees!" A few minutes later, I found the trees and the house, and I parked my car in the driveway. Instinctively I walked around back of the house and that's where I found R.L. Hamilton.

He was sitting by a pile of cut logs, a slight, elderly man who seemed unsurprised that I had come to find him. I asked him about Averasboro. He couldn't take me there, he said, but he gave me explicit directions to find what was left of it. There wasn't much, he said, just the cemetery.

Before I left, he asked me if I'd like to see a painting he had made of Averasboro. He went into his shed and rummaged about until he uncovered a canvas and brought it out into the late afternoon light. He took a rag and wiped the dust off the canvas and held it up. The scene was one that Hamilton remembered from his youth. In dark greens and bright yellows, the painting was dominated by a field with grazing cattle, a pond and a line of forest in the background.

There were two houses in the scene, whose owners he named, and traversing the canvas was a dark road in brown that led to an opening in the forest which he had painted in blue to suggest the Cape Fear River. On the right, lit by a morning or afternoon sun, were a couple of dozen headstones in the small cemetery where the long dead of Averasboro lay in their eternal rest.

"I'll give it to you," he offered, after I said how much I liked the painting. When I said I'd like to pay him, he told me, "You can pay me for the frame."

I love the picture. One might call it "primitive" art because it was painted by an untutored hand, but Hamilton painted his memories with love and an attention to detail. It hangs in my study today, a vivid reminder to me of how attempts to control nature are always risky endeavors, and also of how geology is a story not only of rock and deep time, but also of human dramas told in much more modest time scales. ◆

Lawrence Earley is the former editor of Wildlife in North Carolina. *He is a freelance writer, photographer and historian living in Raleigh. See more of his photography at larryearleyphotography.com.*

The first robin of spring and the last oak leaf of fall signal the changing seasons each year. When you notice the timing of such important events, you're reading

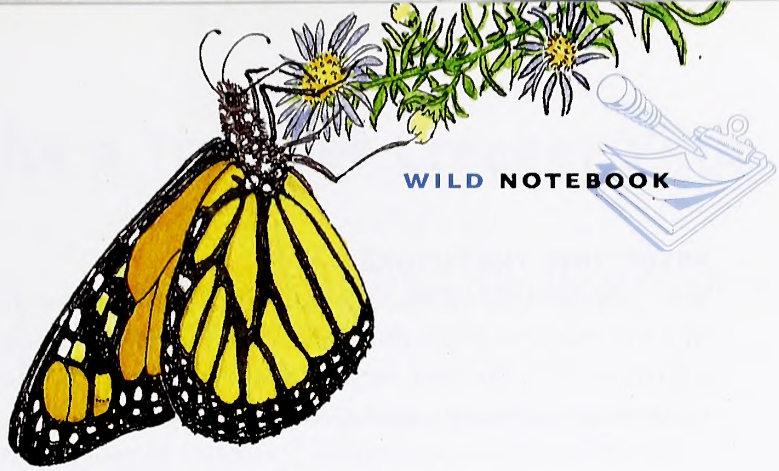
The Earth's Almanac

written by Julie Dunlap / illustrations and nature activity by Anne M. Runyon

Farmers have long turned to calendar books called almanacs to learn when to plant and harvest their crops. But how do wildflowers know when to bloom or birds know when to lay their eggs? Nature follows its own calendar that scientists are just beginning to understand.

OPENING THE BOOK

The science that studies the timing of plant and animal life cycles is called phenology (*fin-AHL-uh-gee*). The name comes from the Greek word, *phaino*, which means "to show" or "to appear." Ancient people observed their natural surroundings, noticing patterns appearing that helped them survive. Native Americans in North Carolina learned that skunk cabbage sprouts signaled warmer days ahead but cricket songs announced it was time to store food for winter. These annual rhythms are so important that Chinese people started recording their patterns almost 3,000 years ago.



LIGHT READING

If Earth's Almanac were a movie, our sun would be the star. Sunlight powers the seasonal changes studied in phenology. As days get longer in spring, the air and soil warm up, snow melts, and rain falls. These environmental changes spark transformations in growing plants that ripple through the food chain. In North Carolina, for example, a trumpet creeper vine sprouts, unfolds its leaves, and blooms by mid-May. Its red flowers provide nectar all summer for a nesting hummingbird. In October, a hawk might snatch the hummer to fuel its flight south for the winter. The timing of wildlife cycles—mating, nesting, migrating—as well as plant cycles depend on the sun.

In the 1850s, naturalist Henry Thoreau wanted to make sense of how living things respond as seasons change. Thoreau scribbled stacks of notes on wildflower bloom times, spring bird arrivals, and fall leaf color changes, sometimes walking 30 miles a day to keep track of everything. Thanks to studies like his in Massachusetts, researchers have figured out that nature's schedule may differ in different places. A distance of just one degree north in latitude can slow spring's arrival by four days. Rising 400 feet in elevation has the same effect. That means a fox in a Wilmington suburb can be munching ripe blackberries in late May, while her cousins outside Durham or on the Blue Ridge might be hungry until early June.

MARKING THE PAGES

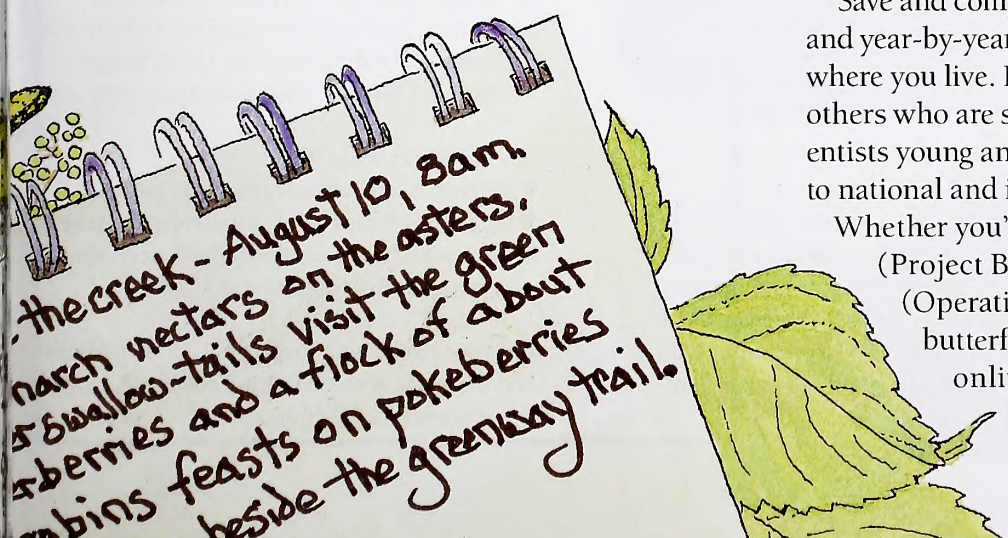
Scientists know that life cycles in the wild are not as regular as clockwork. Many factors—wind, flood, fire, and others—can disrupt the usual timing. A late cold snap can kill many tree buds. A drought can dry up pools of frog eggs. What factors are most important? And how do different living creatures respond to unusual environmental conditions?

To solve this important mystery, scientists need to collect information. In fact, they need volumes of data about when spotted salamanders mate, when longleaf pine trees shed pollen, when big-eared bats emerge from hibernation, and about thousands of other natural events all around the world.

You can help! Getting started as a phenologist is as easy as heading outside with a pencil and notebook. At first, you may want to jot simple notes on backyard observations: the first robin's *"Cheerily, Cheer up!"*, the first butterfly in your flower garden, or the first bright yellow goldfinch at your birdfeeder. Later you can tote a few tools to a park or shoreline. With binoculars, search the trees for squirrels crunching maple seeds or inspect channel marker nests for osprey hatchlings. Use a hand lens to check flowers for pollen grains and a ruler to measure caterpillars and estimate their age.

Save and compare your notes, season-by-season and year-by-year, to uncover patterns in life cycles where you live. Even better, share your notes with others who are studying phenology. Budding scientists young and old can contribute observations to national and international research projects.

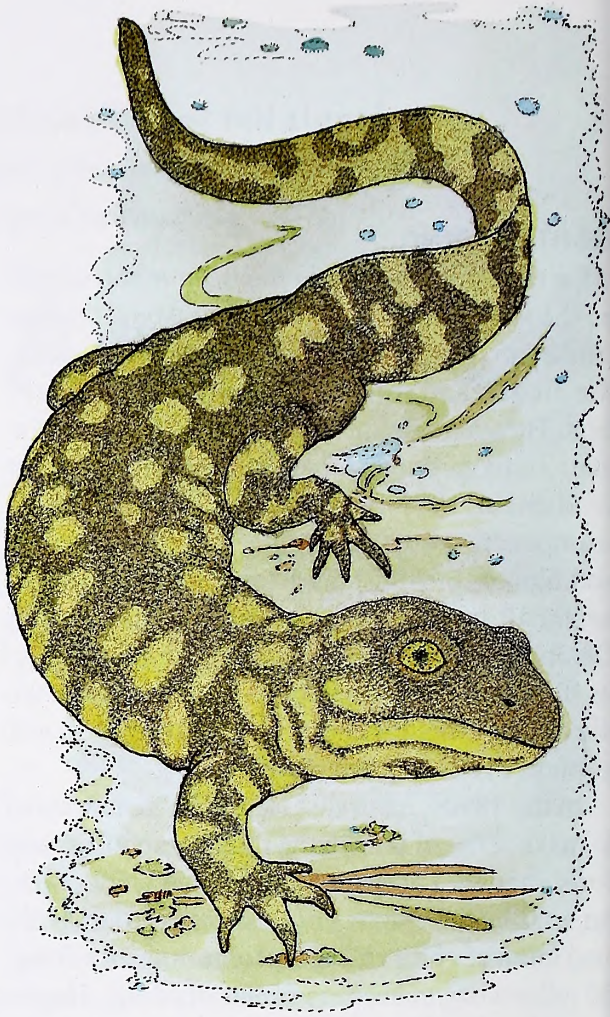
Whether you're most fascinated by plants (Project Budburst) or hummingbirds (Operation RubyThroat) or monarch butterflies (Journey North), there is an online study where your notes can become part of a digital almanac.

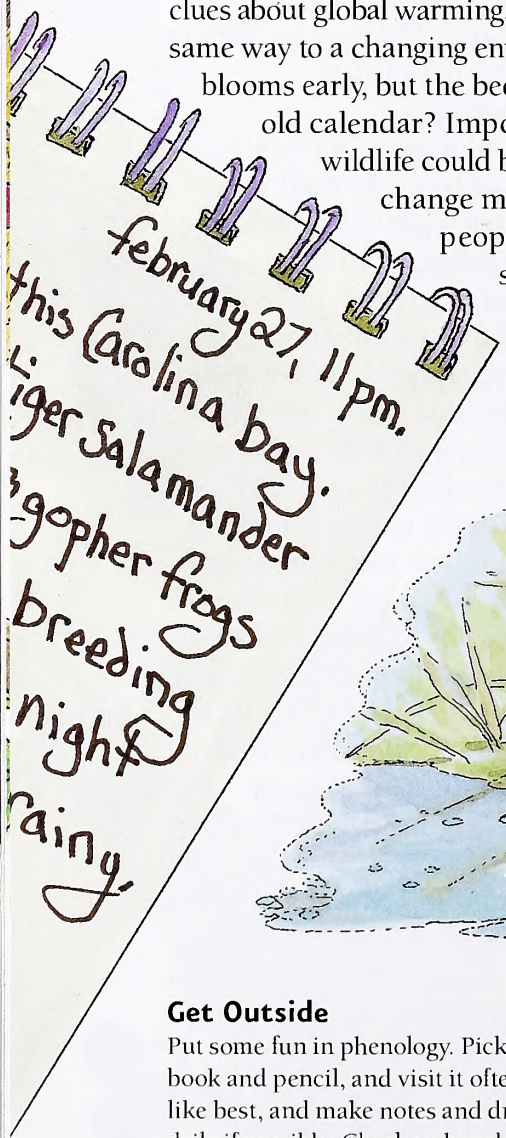


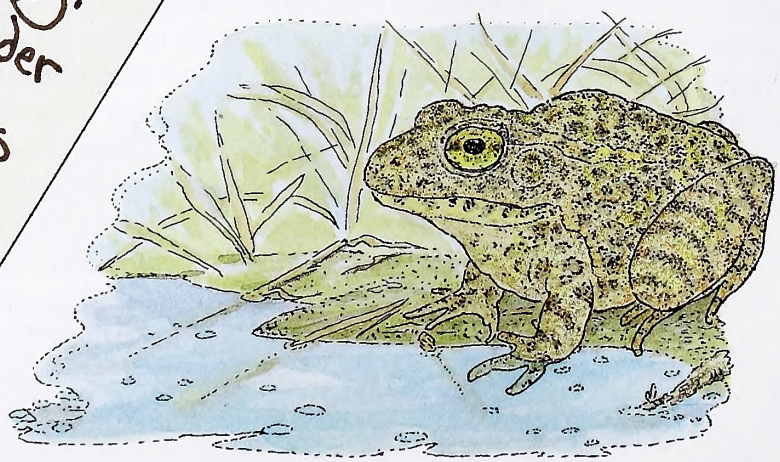
PREDICTING THE FUTURE

Some old-fashioned almanacs told folktales about how to predict the year's weather. But whether or not a groundhog sees a shadow isn't the best way to foresee the future. A better method, say scientists, is to examine data from the past.

Researchers have returned to Thoreau's Massachusetts to look for spring blooms. They found that flowers are appearing up to three weeks earlier than they were in the 1850s. Phenologists are finding early blooming, early migrations, and shortened hibernations in North Carolina, the Arctic, and many other places too. Often the changes are connected to rising temperatures in our warming climate. The timing of plant and animal life cycles is turning out to give important clues about global warming. But not all organisms respond the same way to a changing environment. What if a wildflower blooms early, but the bees that pollinate it still follow the old calendar? Important links between plants and wildlife could be broken. To find out how climate change may alter the natural world, more people need to get outside and study some phenology.







Get Outside

Put some fun in phenology. Pick your favorite outdoor place, take a notebook and pencil, and visit it often. Look for the plants and animals you like best, and make notes and drawings of how they change and behave, daily if possible. Check a phenology website like Project Budburst to learn which life cycle phases (such as budding, leafing, or pollen shedding) to follow most closely. Then enter your data online so others can read a page in Earth's Almanac you helped to write.

Read and Find Out

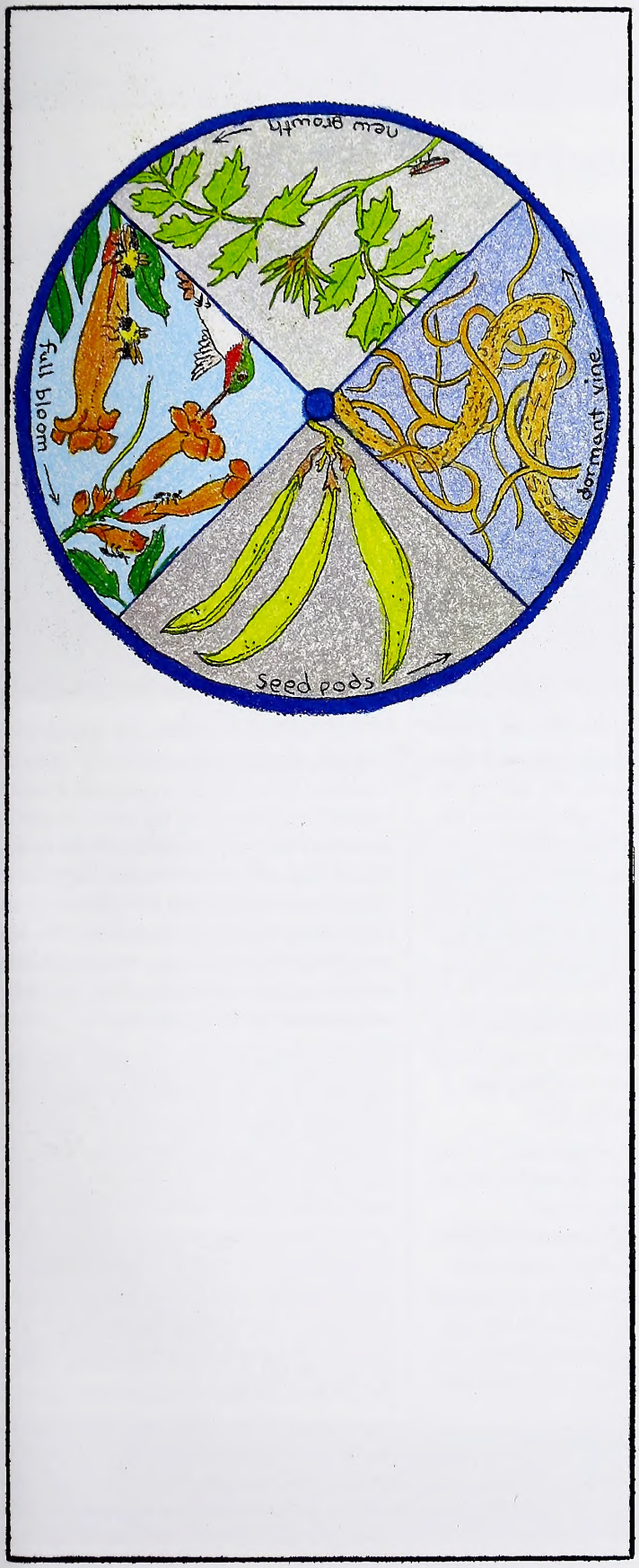
- "Nature's Calendar" by Dawn Flinn, Minnesota Conservation Volunteer, January–February 2007.
- "Walden Warming" by T. Edward Nickens, National Wildlife Magazine, October-November 2007.
- "Teaming up with Thoreau" by Michelle Nijhuis, Smithsonian Magazine, October 2007.
- "Lessons of the Flowers" by Laura Tangley, National Wildlife Magazine, April–May 2008.

On the World Wide Web:

- Journey North www.learner.org/jnorth/
- Operation RubyThroat www.rubythroat.org/
- Project Budburst www.windows.ucar.edu/citizen_science/budburst/

Find out more about Project WILD Workshops and literature at the Wildlife Commission's Web site at www.ncwildlife.org.

Wheel of Phenophases for a Trumpet Creeper Vine



Make a wheel to help you chart the phenophases of a Trumpet Creeper.

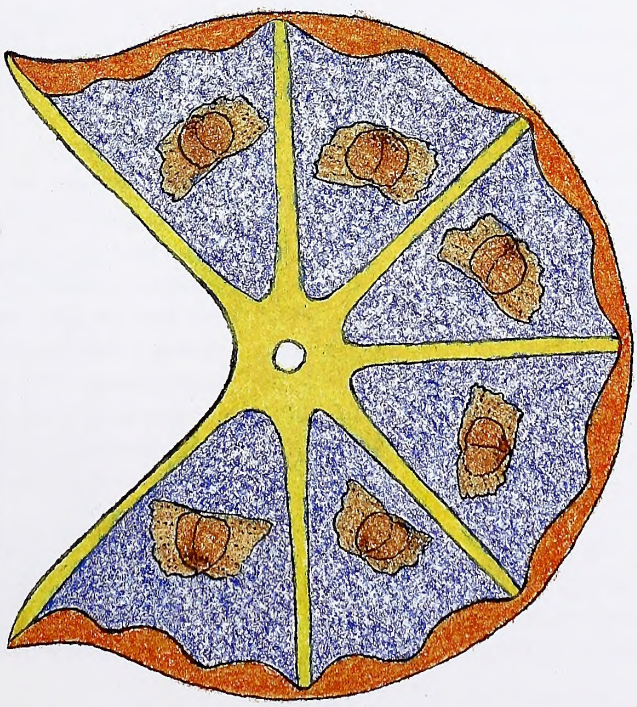
1) Copy activity onto heavy paper, like cardstock.

2) Cut out both shapes.

3) Punch out the center holes and attach the spinner on top of the circle with a clasp. Turn your wheel counter-clockwise.

4) Find a trumpet creeper vine to observe throughout the year. Record its location on your chart.

5) Write notes on your chart about the phenophases you see. Include: Date, Temperature, Weather and any other interesting observations such as: when the first hummingbird visits, what insects come and when they are gone for the year.



Sunday Hunting Questions & Answers

Bow hunting and falconry on private lands and falconry on public lands on Sundays are now legal in North Carolina. The following frequently asked questions provide details for the public about hunting on Sundays.

Who can hunt on Sundays?

Any properly licensed hunter or license-exempt hunter. See page 3 of the *2010–2011 Inland Fishing, Hunting and Trapping Regulations Digest* for a description of license-exempt hunters.

What is the allowed method of take on private lands on Sundays?

Hunters may use longbows, recurve bows, compound bows and crossbows on Sundays. For information about bow-and-arrow restrictions, please see page 41 of the *Regulations Digest* and the Crossbow FAQ. Licensed falconers may practice falconry on Sundays.

What does private land mean?

Private land is any land not owned or controlled by a unit of government (federal, state or local). Property owned by persons, businesses and corporations is considered private. Public lands include game lands, federal refuges, city and county properties.

I am a landowner and I lease my land for hunting. Do I have to allow hunting on Sundays?

No.

What is the allowed manner of take on public lands on Sunday?

Falconry is the only legal method of take on public lands on Sundays.

I hunt on a military base. Is falconry the only legal method of take on Sundays?

Not necessarily. Military installations under the exclusive control of the federal government may allow hunting on Sundays with any legal method of take during open seasons. For more information contact the specific military installation.

What game species can I hunt on Sundays?

All game animals, game birds and animals for which there is an open season may be hunted on Sundays, except migratory game birds. Sunday hunting is allowed only during the open seasons. Please see pages 44-56 of the *Regulations Digest* for season dates.

BILL L

I live in the western part of the state. Can I hunt on the Sundays between bow-and-arrow season and muzzleloader season? What about the Sunday between bow-and-arrow season and gun season?

No. In the counties within the Western Deer Season, Oct. 3, Oct. 17 and Nov. 21 are closed to all deer hunting. These Sundays fall between seasons, not within them.

Are hunters required to wear hunter orange while hunting with a bow on Sunday during the muzzleloader or gun season?

Yes. State law says, "Any person hunting deer during a deer firearms season shall wear hunter orange." The muzzleloader season and the gun season each begin with the first day of the listed season and continue through the last day of the listed season, with all dates being included. Therefore, the muzzleloade and gun seasons are technically open on Sundays, but a hunter's method of take is limited to archery and falconry on private lands and falconry on public lands. Becaus Sundays are still part of the deer firearms sea son, hunter orange must be worn except fo landowners exempted in state law. The blaz orange law does not apply to a landholder his/her spouse, or children who are huntin on land held by the landholder.

What about hunting species other than deer

State law says, "Any person hunting game ani mals other than foxes, bobcats, raccoons, an opossum, or hunting upland game birds othe than wild turkeys, with the use of firearms must wear a cap or hat on his head made o hunter orange material or an outer garmen of hunter orange visible from all sides." So hunters do not need to wear hunter orange o Sundays while hunting the applicable gam animals and game birds since they will no be using firearms.

e NEWSLETTER
Get N.C. Wildlife Update—news including season dates, bag limits, legislative updates and more—delivered to your Inbox from the N.C. Wildlife Resources Commission. Sign up at www.ncwildlife.org/enews.

Safe Boating for Waterfowl Hunters

For the many waterfowl hunters who use a boat, the N.C. Wildlife Resources Commission reminds you that "Home from the Hunt" begins with safety on the water.

"Statistics show that more hunters die from hypothermia and drowning than gunshot wounds," said Capt. Chris Huebner, the state's hunting and boating safety coordinator. "Home from the Hunt, a statewide safety campaign, encourages everyone to enjoy their time outdoors, be prepared and take the proper precautions, and come home safely."

Hypothermia is the loss of body heat. Left untreated, it can prove fatal. Exposure to extreme cold, such as being in cold water or wearing wet clothes in cold conditions, can increase the chance of hypothermia. Capt. Huebner recommends:

- Always wear a life vest.
- Don't overload the boat, especially with passengers.
- Keep hunting dogs prone in the center of the boat.
- Never move about the boat with a loaded firearm.

In the event of capsizing or swamping, stay with the boat. It will still provide some flotation and will be the initial focus of a rescue attempt. Capt. Huebner advises all hunters to be prepared by wearing protective clothing; carrying a cell phone (in a waterproof bag) programmed with an emergency number; and filing a float plan, which includes letting someone know your destination and expected return time.

The Wildlife Commission administers free boating safety education courses that are now required for anyone younger than 26 years old operating a vessel powered by a 10 horsepower or greater motor on public waterways. To check course availability, go to www.ncwildlife.org or call (919) 707-0031.

U.S. COAST GUARD

Core Sound Decoy Guild Schedules 23rd Festival

The Core Sound Decoy Carvers Guild will hold its 23rd annual Core Sound Decoy Festival on Dec. 4 and 5 on Harkers Island. The event is held at the same time as the Core Sound Museum's Waterfowl Weekend.

The festival features many attractions, including antique decoy exhibits, retriever demonstrations, a live auction, and competitions for duck calling, loon calling and head whittling. Food will be sold by Harkers Island Elementary School staff and volunteers, and there will be plenty of shopping opportunities from the many vendors who flock to the festival each year.

Additionally, there is an International Wildfowl Carvers Association-sanctioned decoy carving competition which is an essential part of the Decoy Festival. The adult decoy carving competition is open to anyone regardless of age, and the Young Guns Competition is designed for those who are 17 years of age and younger.

Sunday will be Youth Day, with free admission for those 17 and younger. Door prizes will be awarded, and activities include kids decoy painting, a youth decoy competition, a head carving competition, archery fun, N.C. Wildlife Resources Commission nature exhibit, and a youth loon calling contest.

For more information, please call the Core Sound Decoy Carvers Guild at (252) 838-8818 or visit www.decoyguild.com.

Marsh, Wilson, Ingram Earn Awards

Freelance writers Mike Marsh and Bruce Ingram, and *Wildlife in North Carolina* associate editor Jim Wilson earned writing awards for stories published last year.

Marsh, of Wilmington, won first place in the Conservation category in the Professional Outdoor Media Association's contest for "Bearing Responsibility," a piece in the November 2009 issue of *WINC* about the N.C. Wildlife Resources Commission's Black Bear Cooperator Program.

Wilson took second place in the Fisheries category in the Association for Conservation Information contest for "Home Waters," an essay that appeared in the July 2009 issue.

Ingram, who hails from Troutville, Va., claimed a second-place Excellence in Craft award from the Outdoor Writers Association of America for "The Truthiness Problem," which appeared in the December 2009 issue of *Wildlife in North Carolina.*

IN SEASON

This month, these seasons are open in North Carolina:

Black Bear: See *Regulations Digest* for seasons and locations.
Bobcat: Through Feb. 28.
Brant: Nov. 20–Dec. 4.
Canada Goose and White-Fronted Goose: Resident Population Zone Nov. 13–Dec. 4; Southern James Bay Zone through Nov. 6 and Nov. 13–Dec. 31.
Common Snipe: Nov. 12–Feb. 26.
Crow: Through Feb. 28.
Ducks, Coot and Mergansers: Nov. 13–Dec. 4.
Fox: See *Regulations Digest* for seasons and locations.
Hatchery Supported Trout Waters: Through Feb. 28.
Light Geese (Snow, Blue and Ross'): Nov. 13–March 9.
Mourning Dove and White-Winged Dove: Nov. 22–Nov. 27.
Pheasant: Nov. 20–Feb. 1.
Quail: Nov. 20–Feb. 28.
Rabbit: Nov. 20–Feb. 28.
Raccoon and Opossum: Through Feb. 28.
Rails, Gallinule and Moorhen: Through Nov. 12.
Ruffed Grouse: Through Feb. 28.
Sea Ducks: Through Jan. 31.
Squirrel: Gray and red through Feb. 28; fox through Dec. 31 in selected counties.
Tundra Swan: Nov. 13–Jan. 31 (by permit only).
White-tailed Deer: Eastern: Gun season through Jan. 1. Central: Muzzleloader season through Nov. 12; gun season Nov. 13–Jan. 1. Northwestern: Bow season through Nov. 5; muzzleloader season Nov. 6–Nov. 19; gun season Nov. 20–Jan. 1. Western: Bow season through Nov. 20; gun season Nov. 22–Dec. 11.
Wild Boar: Through Feb. 28 only in Cherokee, Clay, Graham, Jackson, Macon and Swain counties. In the other 94 counties of the state, feral hogs are not considered to be wild boars, and the commission does not regulate them.

There is no closed season or bag limit for groundhog, coyote, striped skunk, nutria and armadillo. There is an open season for taking beaver with firearms or bow and arrow during any other open season for the taking of wild animals.

Check the *2010–2011 North Carolina Inland Fishing, Hunting and Trapping Regulations Digest* for bag limits and applicable maps or visit www.ncwildlife.org.

Tips for Recovering Game Animals

As hunting seasons shift into full gear this month, hunters should remember that they are ethically required to stop the hunt for the purpose of searching for game animals after the shot. The following is a list from the N.C. Wildlife Resources Commission of some simple steps to follow:

CHIP LAUGHTON

- Immediately after the shot, visually note the location of the hunter, the game animal and the last place the animal was seen before disappearing into the woods or brush. Sounds can indicate direction of travel when the animal is out of sight, so listen carefully.
- Pay attention, because game animals often react a specific way when hit with a bullet or an arrow. For example, deer shot in the vitals may jump in the air and kick before running. A gut-shot deer may hunch up and wobble as it runs off. Crashing sounds usually indicate a well-placed shot, a fatal wound and a short tracking distance.
- Wait 15–30 minutes or more before tracking unless the animal goes down within sight of the hunter. Poorly hit game animals require waiting periods of one hour or more, especially in the case of a gut shot.
- Begin searching the ground and low-hanging brush for signs of blood, hair, bone fragments, tissue, feathers and tracks. Kicked-up woodland debris can also indicate direction of travel.
- Blood color provides valuable information: bright and frothy (lung shot), bright nonfrothy (severed artery), dark (muscle or liver hit), dark with vegetative material (gut shot). As a general rule, large amounts of bright, frothy blood will equal a short tracking distance.
- Mark the trail with biodegradable material such as tissue and step alongside the trail (not in it) to avoid erasing sign. This is important if backtracking becomes necessary.
- Seek help from hunting companions when tracking. Several sets of eyes are better than one, especially when tracking is difficult due to low light or inclement weather.
- If you lose the trail, change strategies by walking in ever-widening circles or parallel transect lines. Remain ready for a follow-up shot in case the game animal flushes from cover.
- Approach downed animals from behind. If its eyes are closed and it is breathing, another shot may be required. If its eyes are open, touch near the eye with a stick or branch. If the animal does not blink or move, it is likely dead.

Remember, ethical, law-abiding hunters: Practice before the season to prevent the loss of game animals through wounding. Never use equipment with which you are unfamiliar or unable to accurately shoot. Know that the goal of every hunter is a quick, clean kill and not wanton waste of wildlife. And do not give up tracking until convinced that all reasonable efforts to recover the animal have been exhausted.

CALENDAR OF EVENTS

Saturday–Sunday, November 6–7

Spend a day at the second annual Western North Carolina Fly-Fishing Expo in Fletcher. Fly-casting instruction is offered. Exhibitors include gear manufacturers, fly shops, guide services and the N.C. Wildlife Resources Commission. Visit www.wncflyfishingexpo.com.

Tuesday–Sunday, November 9–14

Learn about the diverse habitats and wildlife of the Outer Banks at Wings Over Water in Kill Devil Hills. Participants may bird and paddle the marshes and coast, listen for red wolves and watch for bears in pocosin forests and open fields. Visit www.wingsoverwater.org.

Readers should check with the contact listed before traveling to an event. Items for listing should be conservation-oriented and should be submitted at least four months in advance to jim.wilson@ncwildlife.org, or call (919) 707-0177.

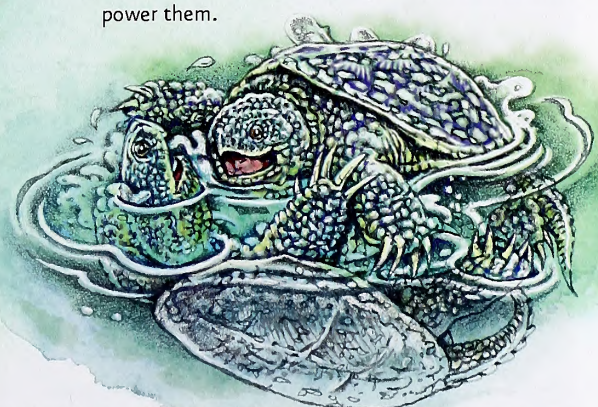
Why Do Male and Female Turtles Often Differ In Size?

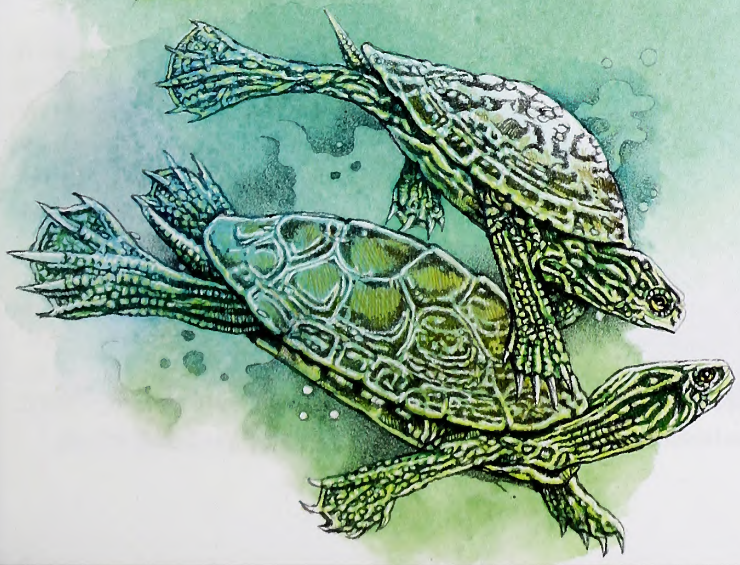
written by Clyde Sorenson
illustrated by Jim Brown

LIKE MANY BASKING TURTLES, but perhaps to a more extreme extent than other species, female map turtles typically are much larger than males. Different turtles use different mating strategies, and the strategy dictates the size relationships between the sexes.

In most terrestrial turtles, such as the Eastern box turtle, the gopher tortoises that live to the south of North Carolina, and the giant tortoises of the Galapagos, males engage in combat for the opportunity to mate, so selection tends to favor bigger males. In these species, males tend to be as large as or larger than females.

Male bottom-walking turtles such as snapping turtles and semiaquatic mud turtles probably encounter relatively few females. When they do find one, they typically forcibly mate with her, willing or not, and they may have to fight other males for the chance. In these species, males tend to be considerably larger than the females because they must be able to overpower them.





Female swimming turtles such as map turtles can easily escape aggressive suitors, so they choose mates based on how effectively they court. In many of these species, the males have exaggeratedly long claws on their front feet that they use to stroke the female, and the courtship can be protracted. For such a male, it is more advantageous to reach reproductive age quickly, and being small is not necessarily a disadvantage — as long he is adept.

Good Ol' Guns

written by Jim Dean

JIM DEAN

Were I suddenly transported into the present from sometime prior to about 1960, I might not recognize a modern rifle or shotgun any quicker than an American Indian would recognize a compound bow. Many newer rifles and shotguns simply look strange, like something a movie superhero might use to neutralize invading aliens.

I picked up one at a gun show recently that had a ventilated housing around the barrel. With the exception of its oddly shaped synthetic stock, it looked like a length of exhaust pipe from the rocker panel on a '32 Ford hot rod. As is fashionable nowadays, the whole assembly was flat black. It certainly had—as the dealer pointed out—an attitude. He didn't qualify that with an adjective, but I don't think he had "sweet" in mind.

"I'm afraid the general public is fearful of any gun that looks like an assault weapon, even though most aren't capable of fully automatic fire and don't really belong in that category," he explained. "In fact, this is actually an extremely accurate single-shot, small caliber target rifle."

"Old-school prejudices like mine are typically celebrated by those of us who are, well, old."

I don't doubt that rifle's inner beauty would have been apparent on any shooting range, but I confess I'm partial to guns that don't look like cinema props from "Blade Runner." A little farther down the line of dealers, I admired two elderly .22 pump-fed gallery rifles that were more to my taste, along with a particularly handsome scoped Model 52 bolt-action .22 target Winchester.

It is probably fair to say that there is a sharp division between those who are attracted to older guns—or at least modern guns built in traditional styles—and those who favor this new genre spawned out of Vietnam-era military hardware.

Old-school prejudices like mine are typically celebrated by those of us who are, well, old. My first .22 was a Model 69 bolt-action Winchester that Santa left under the tree for me when I was 12, and I hunted squirrels with it until Dad left me his semi-automatic Model 63. That gun, by the way, came with a letter from Jack O'Connor on *Field & Stream* stationery. Dad had written him for advice regarding sights in 1940, and Jack recommended having it equipped with a factory-installed Redfield peep sight. The gun is so pretty that numerous squirrels have pranced through the treetops while I was busy admiring it.

Likewise, I grew up hunting bobwhites with double-barreled shotguns ever since Santa bestowed upon me a 16-gauge Fox Sterlingworth (that sly elf knew his artillery). To my mind, a classic American double such as a Fox, Parker, Lefever, L.C. Smith or Winchester 21 is still both a practical and sentimental choice for upland game, even if the higher grades cost a fortune (and still kick like mules).

I have also shot targets and hunted with some fine old, high-stepping varmint rifles, and I hold them in high regard. However, my experience with true big-game rifles is mostly limited to drooling over a smorgasbord of Weatherbys, .416 Rigbys, Holland & Holland double rifles and their ilk. Those guns and any safari that occasioned their use would be far beyond my means, but there's a chance I might yet stalk an antelope with an old .32-40 single-shot Highwall Winchester (my quarry needn't be too concerned, however).

Even in the realm of handguns, my interests are largely confined to older models like the venerable Smith & Wesson .22 target revolvers, and many of my other favorites date to the Colt era of black powder.

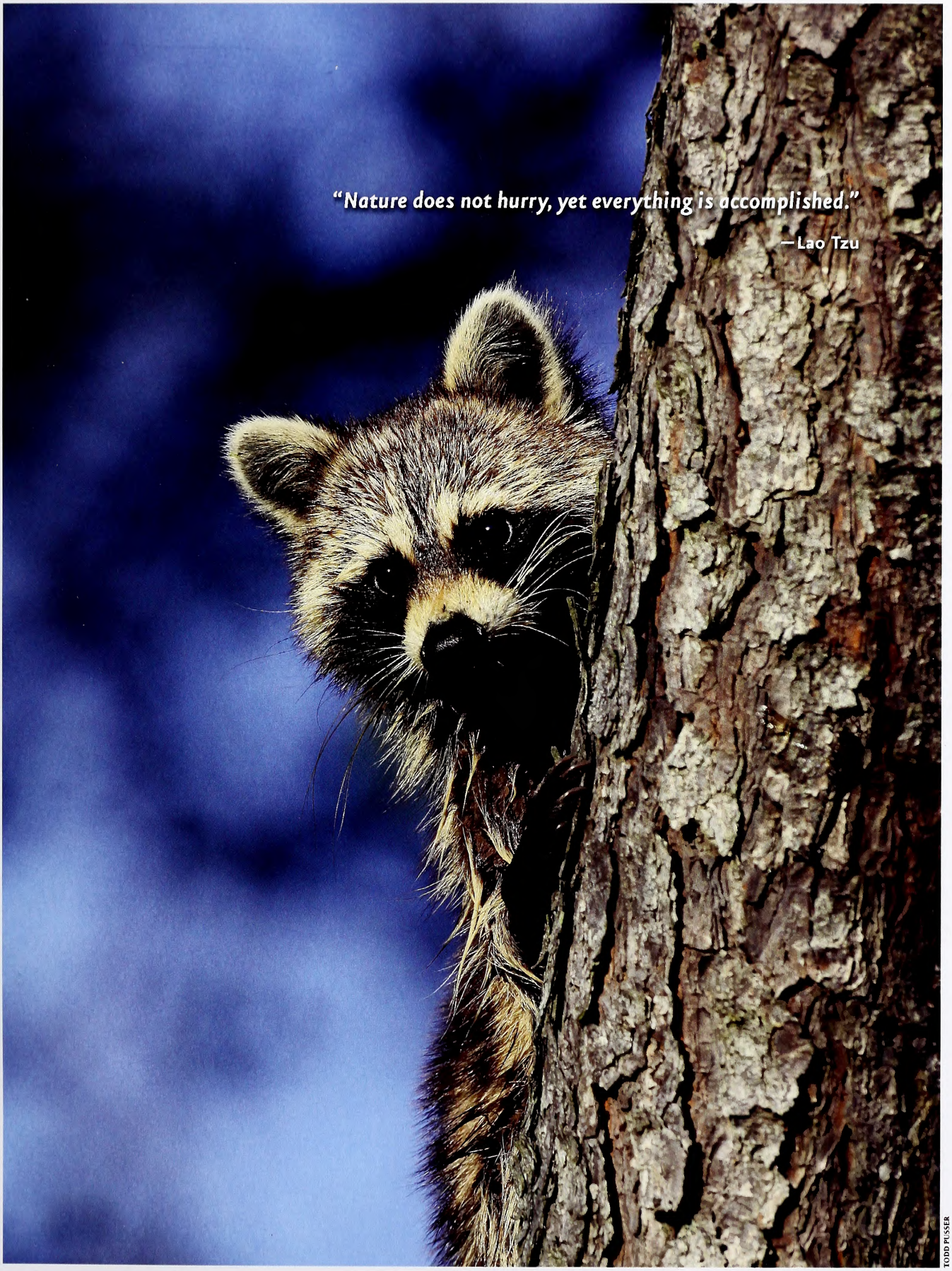
My preference for traditional guns is not universal, however. Duck and dove hunters will understand why I might covet a classic Model 12 Winchester pump, yet choose something entirely different when I'm in cut corn or a blind.

For pure utility, modern gas-operated semi-automatic shotguns are a better choice. They don't kick, they safely handle magnum as well as lighter loads, and they are infinitely reliable and so well balanced that you are barely aware of their weight. Did I mention that they don't kick?

Those that have been Parkerized are also virtually impervious to the elements. Some are also usefully camouflaged and have sensible synthetic stocks, although blued steel and wooden stocks are still options on some of these shotguns for those who can't bring themselves to abandon all tradition.

Indeed, where utility and accuracy are the ultimate goals, it often makes sense to embrace modern innovations. Your pre-1964 Model 70 Winchester or Model 700 Remington is capable of superb accuracy, but if you're hunting deer at extreme range, you're probably already lusting after one of those high-tech Jarrett Bean field rifles. I'm even having second thoughts about acquiring one of those space age, tack-driving target rifles.

Guns, it seems, are a lot like automobiles. We might cherish the past, but we're not hopelessly lost in it if we think a new 16-cylinder Bugatti Veyron might fit nicely in the garage next to the 1956 Mercedes 300SL gullwing coupe.



TODD PUSSER

Raccoon

OUTDOOR MOMENT

IN THE DECEMBER ISSUE

COURTESY OF BOB PLOTT

◀ **DOG DAYS**
The tenacious Plott hound's history is interwoven with that of the family for which it is named.

A FRIEND INDEED
A young man's time with his older hunting mentor was too brief, but the memories are sweet.

TAX BREAK
For the first time ever, property managed for wildlife only can qualify landowners for fiscal relief.

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WILDLIFE IN NORTH CAROLINA

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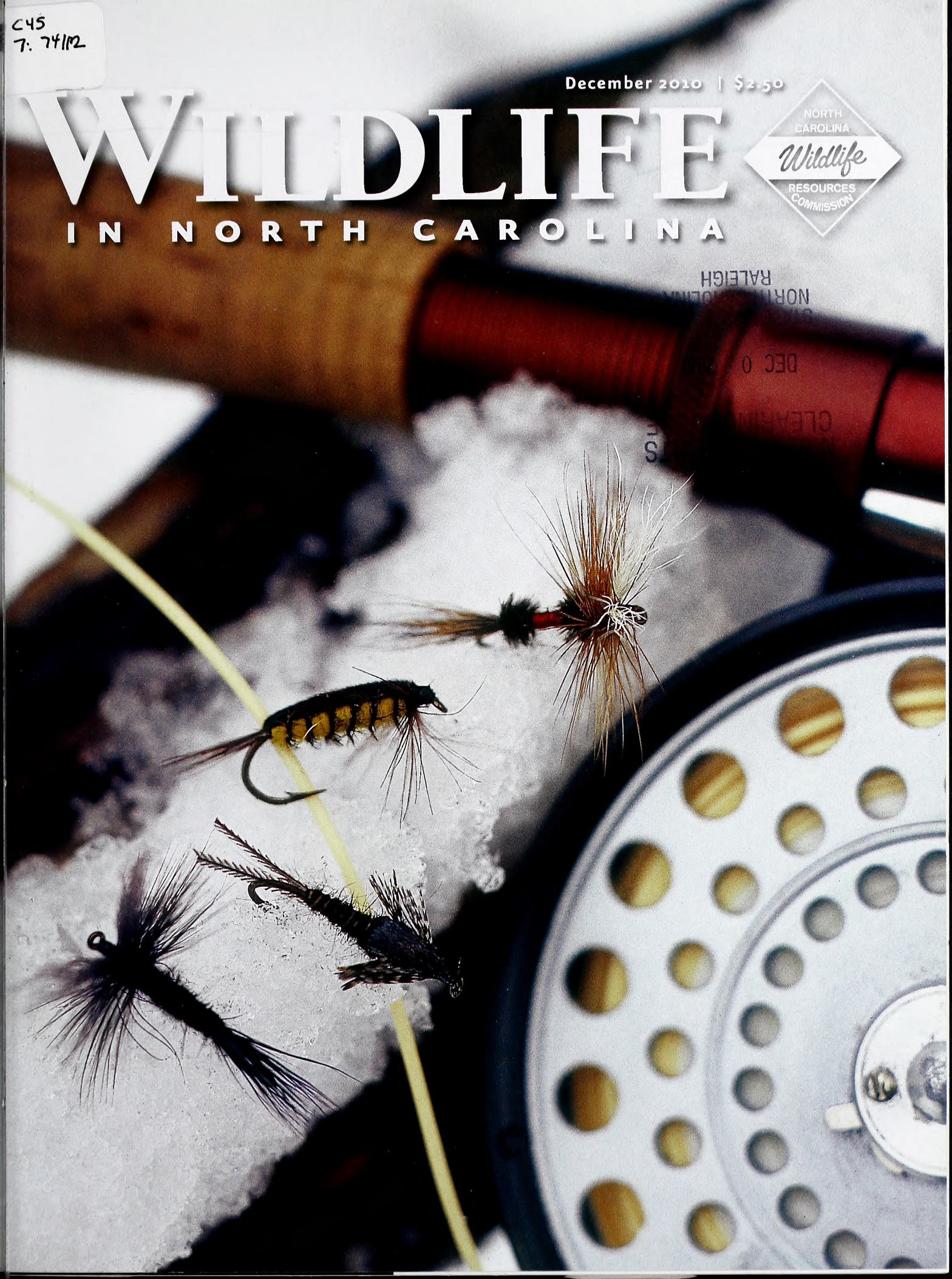
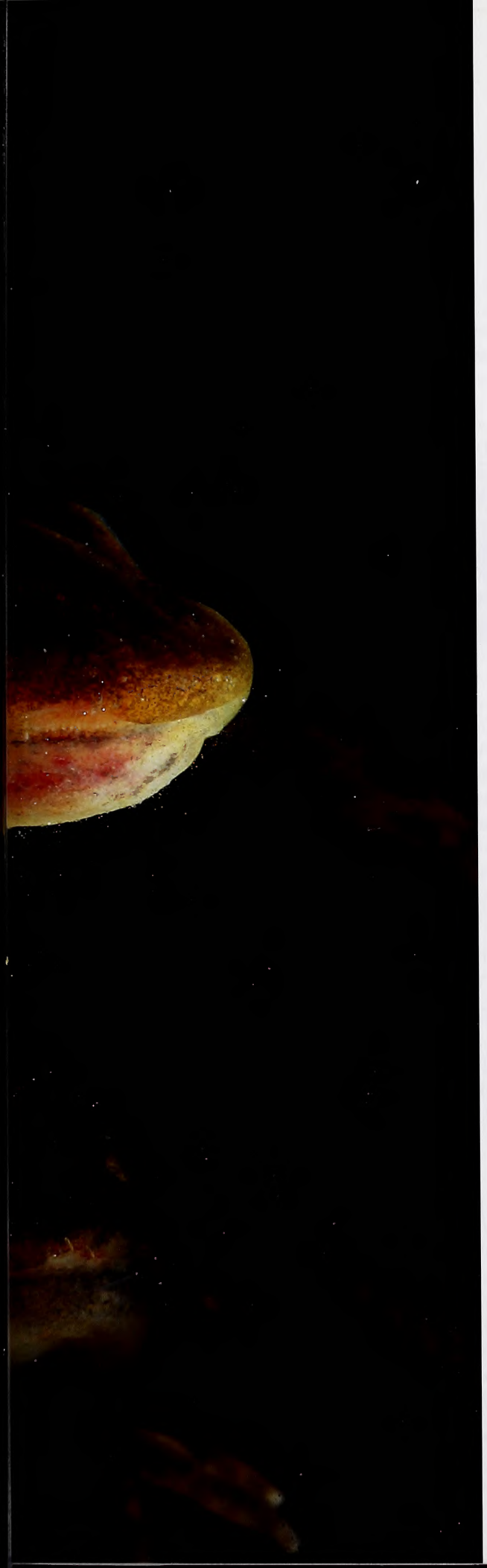


RALEIGH
DEC 0

Eastern tiger salamanders spend their first few months as aquatic larvae. They lose their external gills when they transform into juveniles of our largest terrestrial salamander. **PHOTOGRAPH BY TODD PUSSER.**



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Cover: The presence of snow on the ground doesn't mean it's time to put away trout fishing gear. A little season-specific knowledge can yield winter fishing success. PHOTOGRAPH BY JIM DEAN.

Wildlife in North Carolina is the official educational publication of the North Carolina Wildlife Resources Commission. It is dedicated to the sound conservation of North Carolina's wildlife and other interrelated natural resources and also to the environment we share with them.

EDITOR'S NOTE

Here at the magazine office, the distant past and the immediate future are on our minds. Next month, the volume number of the magazine will change to a milestone figure—75. In November 2011, *Wildlife in North Carolina* turns seven and a half decades old. Despite our advancing age, we still feel good about our mission to educate people about our state's unsurpassed wild natural resources. The magazine is more relevant than ever because of the critical need to deliver conservation messages to the masses.

However, our age is starting to show in a few different ways. With folks reading more and more on their electronic devices, magazines ain't what they used to be. The costs of paper and postage continue to rise each year. The state is grappling with another budget shortfall in the billions of dollars, and something's got to give.

State wildlife magazines have been struggling for at least the last decade. Only six other states still publish monthly magazines. A couple dozen more publish six times a year, and several others have moved entirely online. Most recently, *Louisiana Conservationist,* the wildlife publication of a state that calls itself "Sportsman's Paradise," ceased publishing in 2010 after 87 years in print.

As part of a special 75th anniversary issue we are working on for next November, we need to hear from you. *Wildlife in North Carolina* would have been nothing over the years without the steadfast support of its readers, so we want to make you part of our celebration—and our quest to remain relevant. Send us your favorite memories and stories about (and from) the magazine over the years, how you have shared *WINC* with others, how you use the magazine now, your suggestions for the future, and why you think the magazine is still relevant on its three-quarter-century birthday.

Send your e-mails to letters@ncwildlife.org with the subject line "75th Anniversary" or send regular mail to 75th Anniversary Letters, 1712 Mail Service Center, Raleigh, N.C., 27699-1712. We will accept letters until July 1, 2011.

Happy holidays, and we look forward to hearing from you!

Greg Jenkins

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WILDLIFE
IN NORTH CAROLINA
DECEMBER 2010 VOLUME 74, NUMBER 12

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ood Dog!

Requiem for a Retriever" (Oct. 2010) was so wesome and well written! It really touches the eart for all of us who have loved and lost a good og. There is nothing any sweeter than a dog hat has retrieved birds, worked hard and earned er right to sleep on a pillow with the occasional b eye thrown in, just for good measure!

Tina Kuykendall
Harnett County

d be grateful if you could pass along my thanks o Shari Smith for her wonderful story about weet Kate ("Requiem for a Retriever"). It was o beautifully from the heart and it certainly ouched mine. Please tell her that I carry her n my heart and in my prayers with the hope hat Kate will be quick to send someone to fill he void and shower the love.

Victor DeBelle said it so beautifully in his ssay, "Silver Cargo Special": "For it is said that hose who love beyond the heart and to the ery soul have found true love that bonds two ouls for all times. Those souls, no matter how ar or how long time goes, will always be as one. omeday angels will make another special jour- ey placing that little soul of bright silvery light ack in loving arms."

Pat O'Connor
Winston-Salem

hari Smith brought a tear to my eye with her tory "Requiem for a Retriever." I'm sure many dog lovers joined me in that emotion. There's nothing better than an a loyal, smart, loving dog.

She nailed it beautifully.

Susan Buff
Lincolnton

Cute vs. Creation

As usual, when I received my October issue of *Wildlife in North Carolina*, I quickly flipped through it to get to Jim Dean's "Our Natural Heritage." I've been a big Dean fan for nearly 20 years and relate to much of what he so winsomely shares. Overall, "When Cute Eats Cute" was an excellent article. However, I disagree with his reference to humans as animals. As someone who believes God's Word (the Bible) to be our source of ultimate truth, the Scriptures clearly state that mankind is made in the image of God (Genesis 1:26–27) which sets us apart and above the rest of His creation, and accountable to Him. It also debunks the notion that "concepts of morality ... are entirely human-inspired contrivances."

David Swicegood
Ponte Verda Beach, Fla.

I almost skimmed "When Cute Eats Cute" instead of fully reading it. My thought was, "This is about another state. Why is it being published in *Wildlife in North Carolina*?" Well! I am very glad that I carefully read it. The article is interesting and beautifully written.

Patricia Pepple
Viera, Fla.

Herd's the Word

I enjoyed "Herd Mentality" in the October 2010 issue. Having such a high-profile wildlife success story enhances the appreciation of North Carolinians for our natural resources. This will be essential for the future, as our population and resultant pressures on wildlife, open space and quality of life continue to grow apace. The article reminds us once again that we do not inherit our natural treasures from our fathers, but rather borrow them from our children.

Jonathan Maxwell
Greensboro

Love that Mag

I've subscribed to *Wildlife in North Carolina* for many years. It is such a great magazine that I look forward to getting each month.

I especially enjoy the variety of subjects covered. The photographers and writers do a great job. Keep up the good work.

D.T. Thomas
West End

Squirreled Away

After perusing "Hunting the North Carolina Squirrel Slam" in the October 2010 issue, a few readers wrote to remind us that there are more than three squirrel species in our state. Indeed. In addition to the game species covered in the article—gray, red and fox squirrels—there are three members of family Sciuridae that are not legal to hunt in North Carolina. The Eastern chipmunk and the Southern flying squirrel are common, abundant squirrel species. Chipmunks are found in the Mountains and Piedmont, while the Southern flying squirrel is distributed statewide. The Northern flying squirrel is a rare and endangered creature of high-elevation Mountain forests.

The seventh and final member of North Carolina's squirrel family is its largest. The groundhog (also known as woodchuck and whistlepig) lives in the Mountains and the northern halves of the Piedmont and Coastal Plain. There is no closed season and no bag limit on groundhogs, so one could argue that any "squirrel slam" would have to include one of these animals.

We want Your Feedback

Do you have a comment about content in *Wildlife in North Carolina?* Questions about something you read or have seen? Send us an e-mail at letters@ncwildlife.org.

write us

Letters should be sent via e-mail to **letters@ncwildlife.org** *or through regular mail to Letters,* Wildlife in North Carolina *magazine, 1712 Mail Service Center, Raleigh, NC 27699-1712. Please include your name, address and daytime phone number. Letters chosen for publication may be edited for clarity and length.*

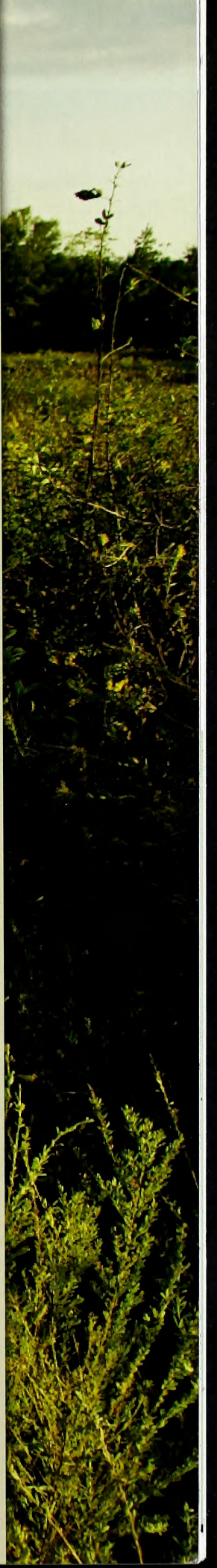
For Wildlife Only

Landowners can now receive tax breaks for managing their land for wildlife—no moneymaking enterprise necessary.

The yearling buck does not bother to move when we park just a few feet away. He merely watches us from his bed in the tangle of briars, seemingly unafraid of the Gator with the dog box on the back. At least twice a week, the green utility vehicle follows a pack of yipping, yelping beagles as they chase rabbits around this field of thick vegetation. Today the dog box sits empty, the small hounds having gotten their exercise a day earlier. Ron Little cuts the engine, and everything goes silent. Almost everything.

"I heard one whistle then. Hear it?" Little asks, cocking his ear toward the sound. As if on cue, another bird calls out. Then somewhere across the field, from a patch of ladino clover or knee-high lespedeza, comes a proud answer. And so it continues, back and forth like an old-time gospel refrain during altar call. A once-common song of the South that greets Little nearly every morning during mating season. The unmistakable rising whistle of wild bobwhite quail.

written by Shannon Farlow photographed by Melissa McGaw



MASLOWSKI WILDLIFE PRODUCTIONS

Landowner Ron Little talks with N.C. Wildlife Resources Commission biologist Ken Knight on Little's property that he is managing for wildlife. Little's early successional plantings have increased populations of Eastern cottontails and Northern bobwhite quail.

According to the N.C. Department of Commerce, North Carolina's population is growing by almost 10 percent annually, which is twice the rate of the rest of the country.

"There's probably two or three coveys," Little says, looking out across the lush landscape. "They're whistling the most this year that I've ever heard them."

Little was born on this Union County farm and, except for a military stint in the late 1960s, has lived here all his life. The quail and rabbits have always been here, too. But as he watched their populations decline elsewhere across the Carolinas during the '70s and '80s, and as he lost his favorite hunting spots one by one to development, the avid rabbit hunter became determined not to let the wildlife on his land suffer the same fate.

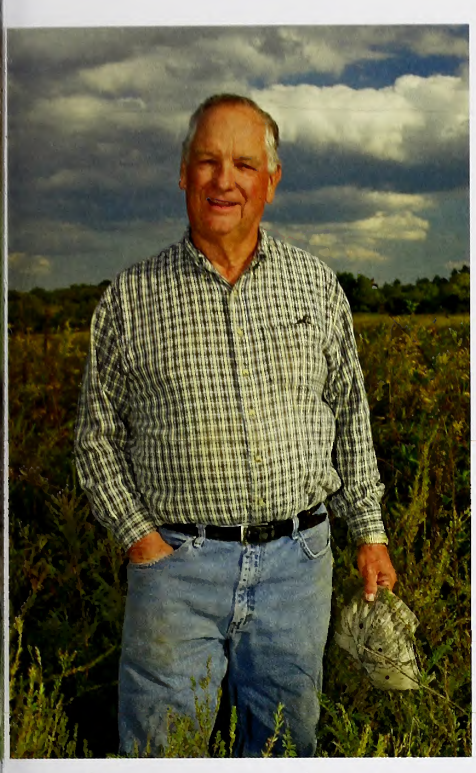
In 1988, Little transformed approximately 46 acres behind his home into a small-game sanctuary where he could train and exercise his beagles. So began his long-term experiment to learn firsthand which types of cover and food produce the most birds, bunnies and other small game.

Since rabbits and quail are both early successional species that require lots of ground cover, Little sowed a variety of grasses and clovers interspersed with small annual food plots. To maintain the early successional stage, he plows half of the 46 acres with a disc harrow in February or March and rotates to the other half the following year. Sweet gums and other tree saplings that will eventually crowd out low-lying vegetation are removed by hand with herbicides.

"It's not a cheap thing. It's not a lazy-man thing because you've got to keep it up," says Little. Since his retirement from an aluminum foundry in 2009, he has been busy "keeping it up." So when he recently received a notice that his property tax was increasing, threatening to dampen his efforts, Little went to see the tax man. "They told me I could go into forestry or start farming it. I told them farming it ain't an option."

To his surprise, Little had another alternative—the newly implemented North Carolina Wildlife Conservation Land Program. Thanks to the efforts of the N.C. Wildlife Resources Commission, the N.C. Wildlife Federation and other conservation groups that worked to get the legislation passed in the N.C. General Assembly, landowners who manage for threatened wildlife or certain wildlife habitats can now qualify for a lower property tax assessment. If the land meets criteria set by the General Assembly and the owner signs a Wildlife Habitat Conservation Agreement to manage for wildlife, then the property can enter the Wildlife Conservation Land Program (WCLP) and be taxed at a reduced rate.

"For the first time ever, wildlife habitat is recognized as a valuable asset to everyone in North Carolina," says Brad Howard, private lands program coordinator for the Wildlife Commission. "Landowners who agree to manage those habitats that we've identified as priorities deserve some type of recognition for doing so. This program provides that for them. And it provides recognition for the



MASLOWSKI WILDLIFE PRODUCTIONS

wildlife and the natural resources of the state. We're excited about it."

Before the WCLP went into effect on Jan. 1, 2010, only private landowners engaging in agricultural, forestry or horticultural production were eligible to receive a reduced property tax assessment through North Carolina's present-use valuation program. Landowners who wanted to utilize their property for wildlife conservation were simply out of luck when it came to tax relief. In fact, property owners enrolled in the present-use valuation program were penalized with a higher property tax if they quit farming or producing timber and started managing for wildlife. Conservation was costly. The lack of any property tax incentive was a major stumbling block for the Wildlife Commission and conservation groups such as land trusts when they tried to encourage private landowners to preserve open spaces and wildlife habitat. (See "With What Time Remains," Oct. 2010.)

Getting Crowded According to the N.C. Department of Commerce, North Carolina's population is growing by almost 10 percent annually, which is twice the rate of the rest of the country. We're currently ranked 10th in the nation with almost 9.3 million people—190 people per square mile.

"The biggest threat that wildlife and wildlife habitat face is people coming here in greater numbers and building roads and houses and businesses. There's just not as much wildlife space left," says Chris McGrath, coordinator of the Wildlife Commission's Wildlife Diversity Program. "It's under pavement or buildings or turned into things that aren't habitat for wildlife anymore, and that's going on every day. It's just gone, and we're never going to get it back."

Almost a decade ago, a committee of Wildlife Commission biologists began assembling data in an attempt to map out a viable strategy for sustaining the state's wildlife habitat and open spaces. The biologists formed descriptions of habitat types they considered the most threatened in North Carolina. They combined these with the inventory of animals from the state's list of protected wildlife species to create the state's Wildlife Action Plan. The General Assembly took that information, crafted a bill identifying six of those habitat types and all of the species, and voted it into law in 2008, forming the Wildlife Conservation Land Program.

To enroll in the WCLP, landowners must first have their property evaluated by a representative from the Wildlife Commission to see if it meets the requirements. "We do not provide actual physical work on their property," Howard explains. "Our job is to tell them what they should do, make suggestions, give them advice as to what they should do to help wildlife. We can assist them in developing this Wildlife Habitat Conservation Agreement, and we will help

WCLP Requirements

Landowners wanting to participate in the Wildlife Conservation Land Program must

- Own 20 to 100 contiguous acres of qualified habitat in one county.
- Have owned the land for at least five years or purchased property that was already in a wildlife conservation land program. Landowners can move their property from a present use valuation program to the WCLP without any penalties provided they have owned the property for five years.
- Sign a Wildlife Habitat Conservation Agreement with the N.C. Wildlife Resources Commission.

For more information, visit www.ncwildlife.org/wildlife_species_con/wsc_land_program.htm or contact Brad Howard with the Wildlife Commission at (828) 294-2605.

More people usually means fewer open spaces and less wildlife. The effects of human development and sprawl are far more permanent for wildlife than those left behind by any hurricane or oil spill.

them identify if, in fact, they do have qualifying habitat."

There are two ways landowners can qualify for the WCLP. The first is by conserving one or more of the wildlife habitat types listed in the Wildlife Habitat Conservation Agreement: bat cave, rock outcrop, small wetland community, stream and riparian zone, early successional or longleaf pine forest. The landowner must possess at least 20 adjoining acres of one of these types of habitat, or a combination of these habitats, to be eligible. Each category comes with specific requirements to be considered qualifying habitat. But they all have one thing in common.

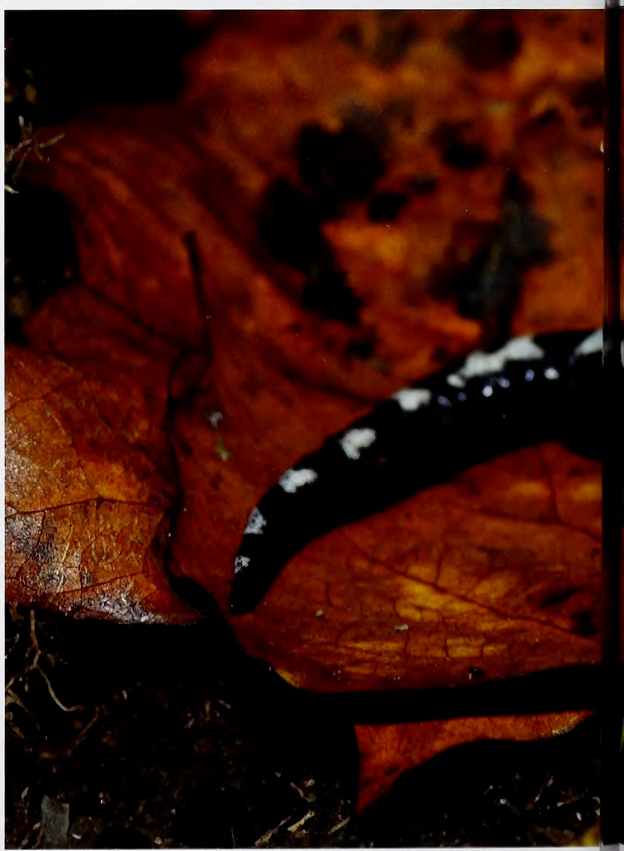
"You have to be active in promoting and keeping up your habitat," says Howard. "It's not an idle land program. It's an active management program." Landowners applying for WCLP status must show that they have been actively managing that type of habitat for at least three years. With more than two decades of management history, Ron Little's land was easily accepted into the WCLP.

"The process for me wasn't any problem at all," says Little. "I just had to fill out some papers, and [the biologist] put in the coordinates on his GPS and wrote down all the types of cover that we had. You can't find any better people to deal with. They're just willing to do what they can to help you."

The second approach to qualifying for the WCLP entails land that protects at least one of the many wildlife species recorded as endangered, threatened or of special concern on the state's list of protected wildlife species, such as the Northern flying squirrel, several species of bats and the red-cockaded woodpecker. "To our knowledge this is the first or one of the first programs like this in the country that actually recognizes nongame wildlife species and rewards the landowner for managing for nongame priority wildlife species," Howard says. "For the first time, these animals actually have a value other than just the intrinsic value. Now these things actually have an economic value."

Landowners must present three years' worth of documentation, such as photos, to prove that the species maintains a stable existence on their property and that they are managing the required habitat. This can be the most difficult part of the process.

Gathering Evidence "One species that's found here is called the mole salamander (*Ambystoma talpoideum*)," says Ann Berry Somers, as she takes a break from cutting down tree saplings. "My son and I collected the largest one ever found of the whole species in 1991, and that's become a voucher specimen in the state museum. But



Ann Berry Somers uses the Wildlife Conservation Land Program to assist her in the management of her wetland property that hosts numerous amphibians such as the tiger salamander. Wildlife Commission biologist Jeff Humphries has no problem locating wildlife on Somers' property.

you can't just have a record from 20 or 30 years ago. In order to qualify for the [WCLP], it has to be active habitat."

When Somers and her husband first bought their property on the outskirts of Greensboro in 1980, one of the natural features she was most excited about was a low-lying area, about an acre in size, just below where they planned to build their home. A creek ran through the center of it, and it occasionally flooded. "I thought, 'Oh, wouldn't it make a good site for a pond,'" says Somers, who teaches conservation biology at UNC Greensboro. After examining the area, she recognized the biological significance of the wetland, which was home to multiple species of salamanders. Somers scrapped the pond and saved the salamanders.

Since then, overgrowth of the forest canopy has begun altering the wetland. Elms and sweet gums prevent sunlight from reaching the wetland floor, stunting the growth of smaller flora that the salamanders depend on. The trees also remove too much moisture from the soil. As a remedy, Somers began a selective elimination, picking out the most damaging trees and axing or girdling them.

To help offset the expense of a professional's removing the larger trees, Somers decided to enroll the property in the WCLP. "The tax break is going to help me cover that cost," Somers says. "I'm not going to end up with more money, but I'll end up with better habitat."

In addition to the wetland, the salamanders need the surrounding upland forest, where they spend most of the year, to survive. With 1 acre of wetland and 20 acres of surrounding upland forest, Somers met the size requirement for the WCLP. She just had to provide a record of existence for the salamanders. Two of the species that live in Somers's wetland—the mole salamander and the four-toed salamander, which Somers found in 2010—are listed as special concern species. "It's hard when you're dealing with such a cryptic species as we are here. To think you can just go out in a year and get a record, you can't," said Somers. "But we were able to this year, so that was very exciting."

After eligibility has been confirmed by a Wildlife Commission representative, landowners are required to sign a Wildlife Habitat Conservation Agreement. Once that is complete, the role of the commission is essentially over. The landowner must present the agreement to the county tax office to complete the process. If a landowner fails to maintain the management strategy as spelled out in the Wildlife Habitat Conservation Agreement, then the county tax assessor will enforce noncompliance penalties.

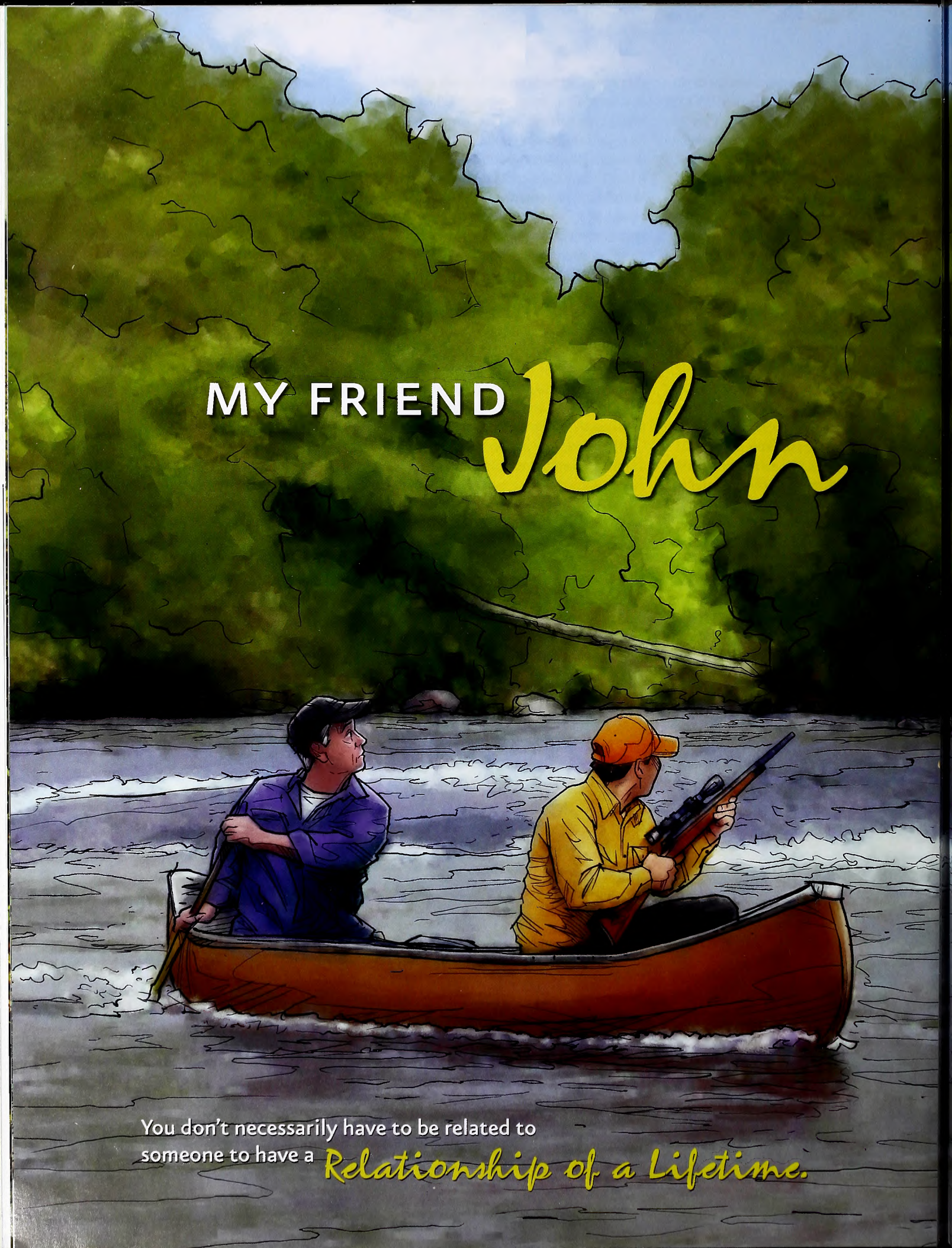
"You have to stay in compliance with the rules of the program. If you don't, then you're going to have to pay three years of back taxes," Howard says. "We stress to the landowners that if you're going to do this, you better commit to do it."

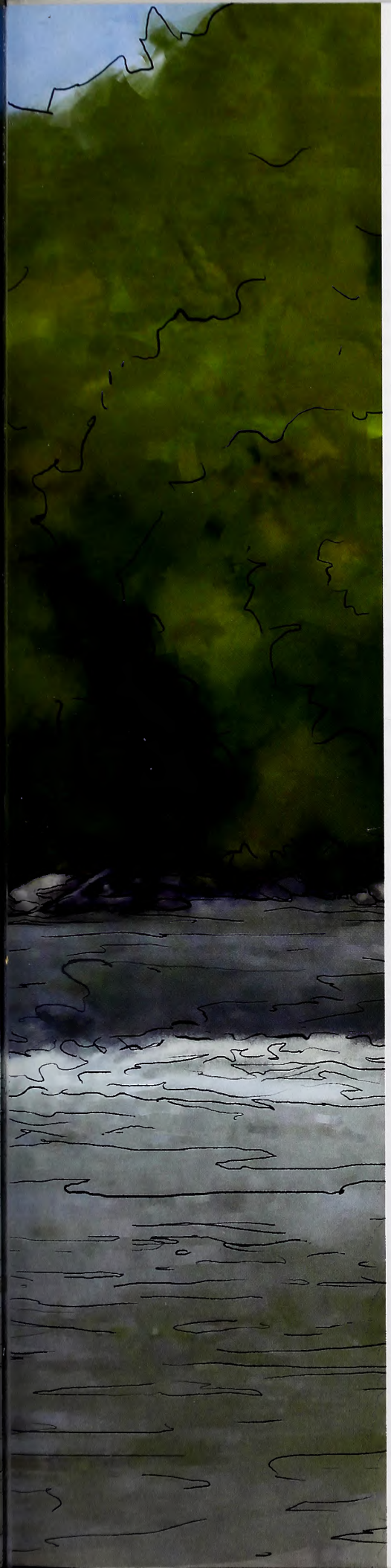
All indicators and statistical models consistently suggest that immigration to the Tar Heel State will continue at a record pace. And who can blame others for wanting to move here? But more people usually means fewer open spaces and less wildlife.

The effects of human development and sprawl are far more permanent for wildlife than those left behind by any hurricane or oil spill. There are no huge government agencies rushing in to remove housing developments and strip malls located on former wildlife habitats.

"We can't stop it. We will never stop it. It's the nature of our state, the nature of this country that we live in," says Brad Howard. "But if we can allow some of the rural lands in this state to stay rural for just a little longer, that would be a very positive thing. I would like to leave some green space green for as long as we can. This program is attempting to do that." ◆

Shannon Farlow is a writer living in Asheboro. This is his first article for WINC.


MY FRIEND John
You don't necessarily have to be related to someone to have a Relationship of a Lifetime.



WRITTEN BY Jeremy Grady ILLUSTRATED BY Joe Mahler

I didn't know either of my grandfathers. One of them passed away a year before I was born, and the other died a year later. But sometimes, people's lives cross and lifelong friendships form. I was blessed with such a relationship that began many years ago, and it turned out to be what I would imagine as grandfatherly.

It all started when I was working at a downtown hardware store. I was fresh out of high school, working full-time and not going to college. I wasn't close to either of my parents, living on my own in a rebellious sort of way, like a lot of other people that age. My job consisted mostly of stocking shelves, assembling everything from grills to tricycles, delivering appliances and doing whatever odd jobs needed to be done. In a corner of the hardware store was a sporting goods department run by Bill Crites. At the end of the day I would hang out there, filtering through the various lures, tackle and rods.

Bill had some flies in large, clear plastic boxes on the glass counter. The boxes needed restocking, so I asked him if I could tie some flies in trade for merchandise. Bill agreed, and over time I got the boxes restocked. Meanwhile, I was spending more and more time in sporting goods and started meeting some of Bill's clientele.

One day a friend of Bill's, an older gentleman named John Collins, came into the store looking for naval jelly. I had never heard of the stuff, much less knew if we had it. (Turned out naval jelly is a brownish orange gelatinous substance that's used to remove rust.) Bill told me what aisle, how far down the aisle and what shelf it was on, so I went exactly where he directed, found it and brought it back to them. John cracked a joke about how the stuff was used to remove lint from your belly button. Bill and John burst out laughing. I was introduced not only to John Collins but also to his witty humor and cackling laugh. Bill told him I was a new employee and pointed out the flies.

After that day, I waited on John every time he came into the store. One day he called me and offered a trade. He offered me some barred lemon wood duck feathers in exchange for some small deer-hair panfish poppers. To fly-tiers these feathers are like gold. They're commonly used for wings on dry flies because of their coloration, and they have natural oils that help them to repel water. I could not pass this up. I tied the flies, and we made the trade. He later took them on a float trip on the South Fork of the New River and fly-fished for rock bass and smallmouth bass. John reported to me that he had very good luck.

The following fall, he brought me some deer tails, which are commonly used for tying flies. Anything from tails on dry flies to bucktail streamers, bucktail jigs and the world famous Clouser minnow can be made with deer tails, or bucktails as they're often called. After he brought the tails, I commented that I didn't know the first thing about deer hunting but would be interested in giving it a try. He didn't say anything at first. But about an hour after he left, he called and offered to take me on some game lands and show me what to look for. We chose a date, and we went.

John explained that white-tailed deer are ridge runners and showed me where to look for trails and various signs. We picked out trees that would be good for a climbing tree stand, and he shared stories about how buck deer act as they slowly walk into range. Not many people would have called some kid out of the blue and offered their time and years of experience. Later, John would go with me to various lands that I had access to and help determine the best stand sites. Most people seriously guard their deer hunting secrets, but I would ask John, and he would share as much as he could. Also, I would help him do tree stand maintenance, and he would always say, "The winter is the best time to do any kind of tree stand repairs and cutting trails."

We ended up catching white bass, walleye and even a rainbow trout. But catching a fish wasn't required to have a good time because I so enjoyed his company.

During deer season, John and I talked every night and compared notes. It seemed like every day of the season he was seeing deer, but I wasn't seeing anything. Oftentimes, he would call me to help drag a deer that he harvested. Then one day he and I both harvested four-pointers. I got my deer in the morning; he got his that evening, and I helped him drag it out.

When I started deer hunting, I didn't have a rifle or clothes. So I borrowed a rifle from my dad. Eventually, Dad, my brother Jason and I started hunting together. The times spent together scouting and target practicing, and the wonderful memories made, helped heal a once-strained relationship. This progress was sparked by John's encouragement with deer hunting.

My first introduction to floating and fishing a river from a canoe came on the Catawba River above Lake James. John loved canoeing. He called me at home one Friday night in mid-April and asked if I would be interested in fishing for some white bass the next day. I could not pass up such an opportunity. The next day he stopped at my house, and I followed him up to the take-out place, then we proceeded to the put-in place. That day he put me in the front of the canoe and told me to start fishing while he was in the stern paddling and steering. We ended up catching white bass, walleye and even a rainbow trout. But catching a fish wasn't required to have a good time because I so enjoyed his company.

We also floated and fished Johns River. I would toss a popping bug to the bank for bass and panfish. John would sit in the stern and throw a gold Rapala or orange Beetlespin. I remember a nice smallmouth that snatched a popping bug one day while we were floating Johns River. When I set the hook, it really just made the fish mad. The fish jumped three times, and after the third jump, it made off with my fly. I looked at John. I didn't have to say a word. He replied, "I guess you know . . . when they take your lure, they have it mounted and put on their wall." It seemed like he always knew what to say when we missed a fish or a deer.

We even squirrel hunted out of the canoe. I had never really thought of squirrel hunting that way. But if the bottoms surrounding the river have cornfields, then using a canoe can be an excellent way to pursue the animals.

The only time I actually fished and hunted during the same trip was a day he took me down Johns River. When I wasn't holding a shotgun, I was casting a gold Rapala. We caught fish, harvested a few squirrels and had a wonderful time.

In later years we went fishing in my bass boat. Finally, John didn't have to paddle to keep me in position—we just let the trolling motor do the work. In the early spring we would fish for white bass and smallmouth. In the summer we fished popping bugs for bluegills. John loved to eat fish, and I always wanted to help him catch a mess.

John had a wonderful sense of humor and was an excellent storyteller. He would tell me stories of his time as a bear biologist for the N.C. Wildlife Resources Commission, in the Air Force and as a student at N.C. State University. One of the things I noticed was that we could sit and talk about anything. There were times he would visit my house or I would visit him, and we could sit, laugh, talk and just plain hang out, which was cool.

Many times while telling his stories, John would get to laughing, which would make me start laughing too. All of his stories had a purpose. One of the funniest times we shared was when I tried chewing tobacco. John took me and my brother Jason to the Dixie Deer Classic, where we got some free samples of chewing tobacco. I didn't chew tobacco (and still don't), but on the way back home I started smelling the stuff. He suggested, "Why don't you put a big clump of tobacco in? See how you like it, but don't swallow the juice." I grabbed a big pinch and put it in my mouth. Within seconds my head began to spin and my stomach started to roll. I spit the mess out. John laughed at me so hard his face turned beet red and he could hardly talk.

This past fall, I purchased a trail camera. It was fun and interesting to see what animals roamed the areas we were hunting. Once a week I'd check the camera, download the photos and call John to share with him what we had. We got photos of deer, turkeys, foxes, raccoons and even a black bear. Being a retired

bear biologist, John loved the bear photos. I told him that if he got a camera, we could use my computer to look at the photos. So he did, and he got some nice pictures of animals too.

One Saturday morning he came over to download some photos. He brought my daughter, Maddie, a small chocolate candy bar and a book titled "The Three Little Pigs." My little girl was elated at the gifts. After looking at the photos on the computer, we took some pictures of John and me. I had never had a photo of him and me together; it was just something that I had the urge to do. We also snapped photos of John holding Maddie, and he was tickled to have a picture with her.

One morning several days later, my brother called me with very disturbing news: John had drowned the day before in a canoeing accident. He was floating Johns River while squirrel hunting with a friend when the accident occurred. My world seemed to stop. John had been at my house just a few days before looking at the deer photos. In a couple of weeks, we were going to hunt and compare notes every night. I had floated many trips with him in a canoe and had probably done the very same float when we hunted squirrels. I didn't know what to think.

How ironic it was that he died in a canoe accident on a river where he fished, hunted the bottoms for deer and worked trapping ducks. He loved Johns River as if it had been named after him. Knowing John, and his passion for life and the outdoors, I don't think he would have had it any other way. At the service prior to his funeral, there wasn't an empty seat. Numerous people spoke of John's gentleness, kindness and unmistakable laugh. He knew people all over the state and no doubt would be missed.

I didn't know whether I would even hunt that fall. But I remembered that a few weeks earlier, when we were looking at photos of two exceptional bucks, he had told me, "Son, you better be in that stand waiting on one of those dudes come that first Monday of rifle season." Knowing John as I did, I thought he would have wanted me to hunt, so I did. I spent a lot of time on my stand thinking about him. There were places in the woods where I could see us trimming limbs for shooting lanes.

John loved family, friends, wildlife and life. He was one of the happiest people I have ever met, and he loved to share his laughter and humor. If you were having a bad day, a talk with him made it seem not so bad. I don't know why he took such an interest in me. Maybe it had a lot to do with how good-natured he was. Whatever the reason he chose to take me under his wing, he was a wonderful person to fill the grandfather role for me. I am just grateful that our lives intersected one day in that hardware store. ◆

Jeremy Grady is a freelance writer living in Morganton and a regular contributor to WINC.

John loved family, friends, wildlife and life. He was one of the happiest people I have ever met, and he loved to share his laughter and humor. If you were having a bad day, a talk with him made it seem not so bad.

A BREED ★ APART

Written by Bob Plott

THE PLOTT HOUND IS TENACIOUS, INTELLIGENT, FAST, VERSATILE, AND ENTIRELY DESERVING OF ITS STATUS AS NORTH CAROLINA'S STATE DOG.

More than 250 years after its arrival in America, the Plott bear hound continues to command respect as the world's best big-game hunting dog. The breed is undoubtedly more popular today than at any other time in its illustrious history—and for good reason.

An Internet search for the Plott hound produces more than 300,000 different entries with information relating to the breed or pertaining to clubs, services and kennels. No fewer than seven states—including North Carolina—have formal bear hunting organizations that are devoted to preserving the heritage of bear hunting with hounds. There are at least two national clubs devoted entirely to the breed and eight more clubs that are dedicated to hunting with Plott hounds in some capacity. In addition, several different magazines published monthly or annually concentrate—at least partly—on big-game hunting with Plott hounds.

These numbers pale in comparison to the massive growth of the sport of raccoon hunting with Plott dogs. Almost every state in the Union now has some form of state and/or local club promoting coon hunting with hounds. The American Kennel Club (AKC) alone held more than 1,400 coon hunting competitions last year, and the United Kennel Club (UKC) three times that number, many of them in North Carolina.

In addition to its reputation as a hunting dog, the Plott hound was also formally recognized by the AKC as a show dog in 2007. And in 2009, the 20th anniversary of the breed's designation as the official state dog of North Carolina, the Plott hound was honored with its own state historical marker in Waynesville.

Other 2009 accolades for the breed included an exhibit at Western Carolina University's Mountain Heritage Center devoted entirely to the Plott hound. After a six-month stay in Cullowhee, the exhibit traveled to the Museum of the Albemarle in Elizabeth City, and it is scheduled for stops in Raleigh and Old Fort in 2011.

Yet despite these recognitions and ample documentation to support them, many Plott hound enthusiasts remain confused about the actual history of the breed. The most common misconception is the mythical story of old Jonathan Plott and his dogs.

NORTH CAROLINA STATE ARCHIVES

Johannes "George" Plott — my great-great-great-grandfather — is generally (and correctly) recognized as the American patriarch of the breed. According to family legend, he arrived in North Carolina from Germany with five of his father's prized hunting dogs around 1750. These dogs, reportedly three brindle-colored and two buckskin hounds, were the foundation stock of the Plott breed. Yet, contrary to popular belief, Johannes Plott never lived any farther west than what is now Catawba County, where he died in 1810. He probably hunted in the Mountains, but he never lived there — nor was his name Jonathan. Nevertheless, the myth persists regarding old Jonathan Plott and his legendary Mountain Plott hounds.

Henry Plott, the son of Johannes Plott, was my great-great-uncle. Henry did indeed take the first Plott dogs to the mountains of Haywood County when he moved there permanently in about 1800. Some historians have said that Henry moved there alone in 1780, but this is incorrect — he was only 10 years old at that time. Others have credited Henry's brother John with taking the first Plott hounds to the Mountains. This too is incorrect, as John never lived west of the Catawba River.

Four of Henry's sons — John T., Amos, Enos and David — did become notable Mountain Plott hound breeders and bear hunters. These direct descendants, and in later years Montraville, Von, Herbert and John A. Plott, deserve the most credit for perpetuating the family legacy of the Plott breed. They would soon be joined by non-family members Gola Ferguson, Taylor Crockett and Isaiah Kidd, all of whom played prominent roles in 20th-century Plott hound history.

And what an incredible history it has been. But many folks remain almost clueless about the merits and Germanic origins of the Plott hound breed, even with its worldwide notoriety. What qualities really set Plott hounds apart from all other dogs? How are they trained?

Perhaps it is best to let a few voices from the past answer these questions. Though these men are now deceased, their words ring as true today as they did when they were first spoken. This legendary group includes Plott family members Von Plott and George Plott, along with Taylor Crockett, Jake Waldroop, Dempsey Vance and Dewey Sharp. Their words are echoed by two latter-day breed experts, both still alive and well: John Jackson and C. E. "Bud" Lyon.

I offer a detailed account of the Germanic origins of the Plott dog in my book "Strike and Stay: The Story of the Plott Bear Hound." But breed icon and Plott family member Henry "Von" Plott (1896–1979) explained it like this:

They (the Plott family) first developed the dogs in Germany. I don't know what they tried

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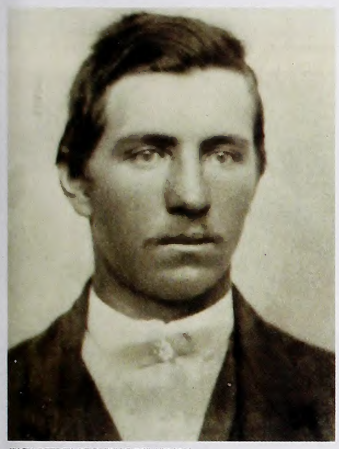
Previous page: One of Von Plott's Plott hounds, 1952. This page: Von Plott hunting with Plott's Happy, Plott's Balsam and Plott's Link. It is believed that Hugh Morton took this photo in the 1940s. Opposite page, from top to bottom: Plott hounds at the John Plott homeplace in Waynesville; family patriarch Montraville "Mont" Plott as a young man, circa 1870; George and possibly Cody Plott hunting, December 1938; and a 1930s bear hunt in Graham County that included three Plott brothers—Von at far left, John at second from left and Sam, bending at right.

NORTH CAROLINA STATE ARCHIVES



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NORTH CAROLINA STATE ARCHIVES

to get the first Plott hounds. I wasn't there. I never been there. But they put out good stuff now, the Germans are smart people! I don't know what their name for the Plott dog was in German. But when the old man (Johannes "George" Plott) brought them here, they named them after him — they called them Plotts. But I don't know exactly what they were. They used the dogs to hunt bear and boar over in Germany. So these dogs have been here more than 200 years. But the old man surely had some idea of what he had. He figured they'd be worth something to him — and they sure as hell HAVE been worth something to him and us too!

We might not know the exact origins of the breed. But we certainly cannot argue with the end result — a dog with a host of amazing skills.

Qualities such as courage, speed, heart, nose, loyalty, tenacity and stamina are commonly attributed to Plott hounds. And though experts would readily agree with those attributes, they add that the multipurpose capabilities of the dogs, along with their grit and intelligence, really make them special, truly a breed apart from all others.

THEY WAS GOOD FOR HUNTING JUST ABOUT ANYTHING. IF THERE WASN'T NO BEAR FOR THEM TO GO AFTER, WHY, THEY'D CURL UP A COON. THEY'D RUN WILDCATS SOME, AND THEY COULD FIND RIGHT WHERE A WOLF WAS. THEM PLOTT HOUNDS WAS JUST JACKS-OF-ALL-TRADES!

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After returning home from World War II, Taylor Crockett (1908–1996) devoted his life to breeding Plott hounds and to big-game hunting in western North Carolina. Crockett also spent a lot of time studying breed history. He recalled that the early Mountain settlers valued their dogs as herders, hunters, trackers and protectors.

When my brother was just a toddler, I had an old Plott female that would take care of him. We lived on this farm and had big old turkey gobblers and geese and chickens running around, and a big old sow or bull might get out too. You had to really watch kids, you know? My brother would get out of sight, but I didn't have to worry, because that old Plott female would stay right with him. And if a chicken, bull or anything else got near him, why, she'd put it in high gear!

Jake Waldroop's family was from the Nantahala area of the Great Smoky Mountains,

between Aquone and Andrews. Jake was a skilled hunter and houndsman. His family obtained their first Plott hounds in the late 1800s. He remembers their talented dogs:

They was good for hunting just about anything. If there wasn't no bear for them to go after, why, they'd curl up a coon. They'd run wildcats some, and they could find right where a wolf was. Them Plott hounds was just jacks-of-all-trades!

Multipurpose dogs indeed. But it takes a lot of grit to hunt bears. And according to "Big" George Plott, a decorated veteran of three wars and an older brother of Von Plott, the Plott dog had no shortage of that.

Our dogs had to stay with the bear at the tree. This breed of dog won't quit, he may get clawed and chewed but he will be back next week. It is one with plenty of guts. The man (or hunter) who isn't game isn't fit to have him.

Modern-day hunter and dog breeder Bud Lyon of Lake City, S.C., was a close friend and hunted often with breed legends Von Plott, Gola Ferguson and Taylor Crockett. Lyon has raised and hunted Plott hounds for more than half a century. He agrees with the comments of George Plott.

One thing you could always count on with a Von Plott-bred Plott hound was that it would strike a bear trail and stay on it. And stay and stay and stay. There was just no quit in his dogs.

Graham County native Dewey Sharp (1909–2008) hunted bears with Plott hounds in western North Carolina for 80 years. I talked with him about his Plott dogs and bear hunting shortly before his death. Sharp reminded me that it required hunters with special stamina to stay with their Plott dogs —and he rightly emphasized that it was the hunter's obligation to do so.

The Plotts were aggressive; there was no back-up in them. They were real bad to fight a bear to the death, and they would not stop until either the dog or the bear was dead. If you did not get to them quick, they'd sometimes try and latch on to the bear like they'd do with a hog. But a bear is just too big and strong for them to do that. You had to follow a bear trail close and get to your dogs fast— and I mean real fast — or else you'd lose one or two of them every time.

In other words, both the Plott dogs and their masters — or at least the good ones — must have a passion for the chase. Taylor Crockett said it best:

Bear hunting with dogs is the most rugged sport that we have in the hunting line. To do it right you have to be in good physical condition. You generally find the bear in the very roughest places that he can find. It calls for a lot of endurance, determination and perseverance (from both dog and hunter). Just everybody's not a bear hunter. A real bear hunter likes to get in there with the dogs and find the track and turn loose on them. That's what separates the men from the boys.

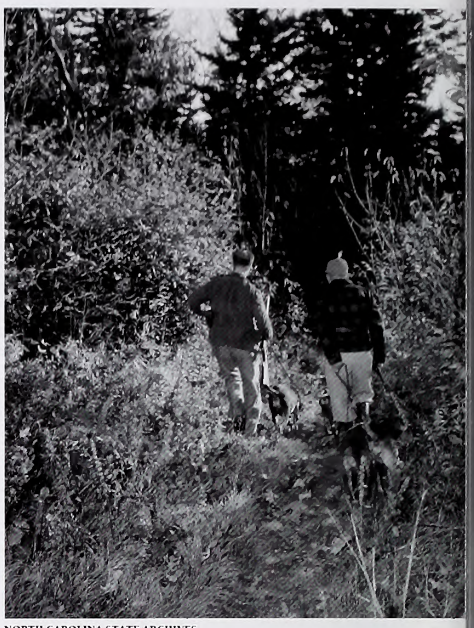
A good argument can be made that there are many dog breeds that are fiercely tenacious — Airedales are a good example. But what really separates the Plott dogs from all others is their keen intelligence. Though undoubtedly courageous, they are generally smart and agile enough to avoid serious injury.

John Jackson of Boone agrees with this assessment. Jackson has raised and hunted Plott hounds originating from the Taylor Crockett kennels for more than 25 years. He is a dedicated big-game hunter and a fine writer and breed historian. Jackson eloquently describes the intelligence of the breed.

The most impressive quality of these outstanding dogs, however, was not their ability to readily and fiercely mix it up with large and dangerous animals, but rather their intelligence. The dogs seem to have an innate ability to bond with their owners and seemed to possess the unusual capability of knowing what the hunter was thinking or needed. There just seemed to be a unique bond between these dogs and their masters that few other breeds had.

People unfamiliar with the breed often are curious as to how Plott hounds should be trained to get these outstanding results. Opinions on this vary by breeder. Some Plott enthusiasts have fairly elaborate training regimens and a specific timetable for evaluating their dogs. Von Plott basically disagreed. He attributed the success of the breed to good breeding practices and natural instincts, though he firmly believed that a dog should not be started on big game until it was at least a year old. Here are his thoughts.

I start training my dogs when they are three or four months old — just take 'em to the woods and let 'em learn what their nose is for. You take them out and find your bear track, and



NORTH CAROLINA STATE ARCHIVES

COURTESY OF ELIZABETH PLOTT AND FONDA MARTIN

NORTH CAROLINA STATE ARCHIVES

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COURTESY OF MARSHALL McCLUNG

COURTESY OF ELIZABETH PLOTT AND FONDA MARTIN

NORTH CAROLINA STATE ARCHIVES

COURTESY OF PLOTT FAMILY COLLECTION

Top to bottom, left to right: Mount Mitchell Bear Hunt Club, Marion, 1948; the Graham County home, family and Plott hounds of Samuel Blake Lovin, late 1870s, the earliest known photo of Plott hounds; Amos Plott's 50-caliber bear rifle from the 1840s with detail of patchbox below; Mount Mitchell Bear Hunt Club members carrying bear; Von Plott and possibly grandsons with Plott hounds in Waynesville, circa 1952; a Plott hound resting in a car trunk after a hunt in Robbinsville, 1940; and author Bob Plott with Plott's Bud.

you can tell whether he is going to be ready or not when he smells it. It's up to the dogs. They train themselves. It's instinct. He knows what to do when he gets big enough. First bear he smells, he'll take after it.

But I don't actually let them get on a bear until they are older — about a year old. When he's about a year old, you can put him on bear, but don't start him any younger than that or you'll ruin him. You wouldn't send a 12-year-old boy out to fight a full-grown man, would you? Hell, no. He's a boy, he ain't a man yet. It's the same with a dog. He'll have to be at least a year old before I put him on a bear.

Tennessee businessman Hack Smithdeal was a close friend of the Plott family and bought his first Plott hounds from them. Smithdeal played an integral role in the breed's gaining nationwide recognition in the late 1940s. He employed an outstanding group of hunters and dog handlers he referred to as his brush-busters. Dempsey "Shook" Vance of Altamont was among the best of them. Vance agreed that Plott hounds are born with a natural hunting instinct.

I don't know how it is, but them hounds know what to do no matter how smart and dog-wise the bear is. If it ain't deep-bred instinct, they sure pick up Plott trade secrets mighty fast!

All of these attributes make the Plott hound unique. But it is the story of the breed that is perhaps most impressive. It is a tale of classic Americana with roots deeply entrenched in Tar Heel soil. It is a story of a family that stayed true to the origins of their magnificent dogs and continued to refine them for more than 250 years.

Perhaps more important, it is the story of how the Plott family inspired a long-lasting, fierce devotion among their descendants, friends and supporters to preserving, improving and perpetuating the legacy of their extraordinary dogs. This is what truly sets the Plott hound breed apart from all others. And it is why all North Carolinians can take pride in claiming the Plott hound as their official state dog. ◆

Bob Plott, who lives in Statesville, is the author of four books, including "Strike and Stay: The Story of the Plott Hound" and "A History of Hunting in the Great Smoky Mountains." Find out more at www.bobplott.com.

CAROLINA GOPHER FROG (*Rana capito*)

State-listed as threatened, the rare and secretive gopher frog has lost most of its habitat, but a few populations persist in our Sandhills and southeastern Coastal Plain.

Portraits of Diversity PHOTOGRAPHED BY TODD PUSSER

AMPHIBIANS

North Carolina contains the most biodiversity of any temperate region in the world. This series highlights the unique diversity of life found within our state's borders, photographed against neutral backgrounds to emphasize each species' individual characteristics.

Amphibian means "double life," reflecting the dependency of this class of animals upon both water and land. True pioneers, amphibians were the first vertebrates to successfully colonize land, paving the way for reptiles, birds and mammals. Most North Carolina amphibians have aquatic larval stages and must return to water to breed, but several salamanders in the large family Plethodontidae cheat water dependency by depositing their eggs in damp, sheltered spots on land. Their larval development takes place entirely within the egg, which hatches into an adult in miniature. Water ties remain, however, in their dependency on moisture, and plethodontids are most numerous and diverse in the cool, damp forests of our Mountains.

North Carolina's amphibian diversity rivals that of any place on Earth, with more than 90 species: 30 of anurans (frogs and toads) and more than 60 of salamanders (which number will vary depending on whom you ask, and on what day; new salamanders are frequently recognized, often via molecular techniques, and the taxonomic status of some forms is continually debated). Our diverse amphibian fauna includes aquatic, terrestrial, arboreal and fossorial species. It includes marvelously grotesque hellbenders; graceful, two-limbed sirens; colorful, agile treefrogs; big, booming bullfrogs; and strikingly colored and patterned salamanders. From the little grass frog, which can sit on a pencil eraser, to the two-toed amphiuma, which can approach 4 feet in length, amphibians play crucial roles in our state's ecosystems. Some, such as the green frog, Fowler's toad and Eastern newt, are common, fairly conspicuous and widely distributed. Others, including the green salamander, Junaluska salamander and Carolina gopher frog, are secretive, rare habitat specialists, seldom encountered. Many species and populations are imperiled by human activities. One—the river frog—is believed extirpated from our state.

Amphibians are excellent bioindicators—proverbial "canaries in the coal mine" for environmental conditions. This is due largely to their permeable skins, which are highly sensitive to whatever they come in contact with. Besides featuring prominently in art, literature and other aspects of our culture, amphibians have been valuable to us as food; in medicine; as insect control agents; and in increasing our understanding of ecology, genetics, anatomy, physiology and many other facets of our world. The breeding calls of frogs and toads are friendly, familiar sounds.

Among many amphibian adventures afield, few have been more rewarding than those shared with my longtime photographer friend Todd Pusser, and few individuals are more skilled than he in capturing their diversity and personality on film. Todd photographed the subjects in these pages against neutral light or dark to highlight their features without the distraction of background elements. Enjoy these portraits of creatures bound to both land and water.

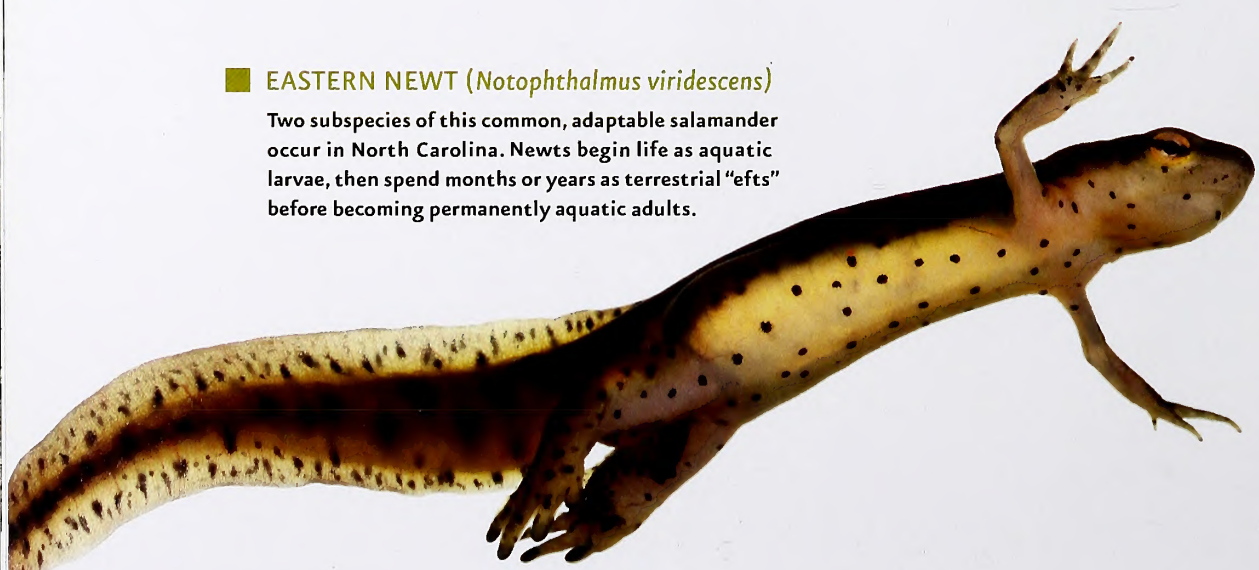
—Jeff Beane

EASTERN TIGER SALAMANDER (*Ambystoma tigrinum*)

State-listed as threatened, this large, secretive salamander breeds in ephemeral ponds in longleaf pine savannas.
Left: Typical adult. Top: Specimen with unusual pinkish coloration.

SQUIRREL TREEFROG (*Hyla squirella*)

Common in our Coastal Plain, this small treefrog has excellent color-changing ability. Its name derives from its call, which resembles a scolding squirrel.



EASTERN NEWT (*Notophthalmus viridescens*)

Two subspecies of this common, adaptable salamander occur in North Carolina. Newts begin life as aquatic larvae, then spend months or years as terrestrial "efts" before becoming permanently aquatic adults.

How Do Aquatic Salamanders Respire?

See Nature's Ways, page 39.

JORDAN'S SALAMANDER (*Plethodon jordani*)

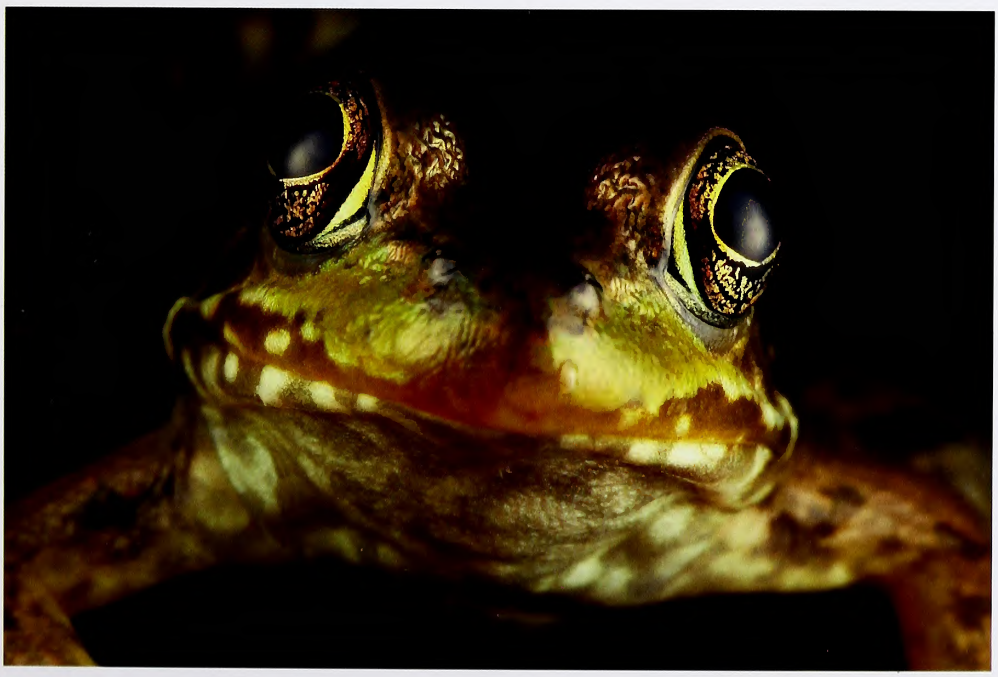
This terrestrial salamander was named after the ichthyologist David Starr Jordan. Its small range lies entirely within Great Smoky Mountains National Park.

ORNATE CHORUS FROG (*Pseudacris ornata*)

This colorful, secretive winter breeder uses large ephemeral ponds in longleaf pine savannas. It has undergone serious declines in recent years.

GREEN FROG (*Rana clamitans*)

This abundant frog occurs throughout North Carolina in a variety of aquatic habitats. Its call resembles a loose banjo string being plucked.



AMERICAN BULLFROG (*Rana catesbeiana*)

North America's largest frog, the abundant bullfrog and its booming "jug-o-rum" call are well known throughout North Carolina. A juvenile is depicted here.

LITTLE GRASS FROG (*Pseudacris ocularis*)

This tiny Coastal Plain resident is our smallest amphibian. Its insect-like call is so high-pitched that some people have difficulty hearing it.

GREEN SALAMANDER (*Aneides aeneus*)

Currently our only state-listed endangered amphibian, this terrestrial species occurs in six counties in our southwestern Mountains, where it inhabits shaded rock outcrops and sometimes climbs trees.

PINE BARRENS TREEFROG (*Hyla andersonii*)

This beautiful, uncommon frog inhabits bay heads, seeps, and pitcher plant wetlands in our Sandhills and southeastern Coastal Plain. Its call is a nasal "quonk."

TWO-TOED AMPHIUMA (*Amphiuma means*)

Our longest amphibian, the eel-like, swamp-loving amphiuma may bite if carelessly handled. Among its many unique features are its tiny limbs, each with only two toes.

RED-LEGGED SALAMANDER (*Plethodon shermani*)

Unlike most amphibians, members of the genus Plethodon undergo their entire life cycle on land. This colorful species occurs in the Nantahala and Tusquitee Mountains.

SPRING PEEPER (*Pseudacris crucifer*)

Though abundant, this small harbinger of spring is more often heard than seen. It breeds in temporary wetlands throughout most of North Carolina.

SOUTHERN TOAD (*Bufo terrestris*)

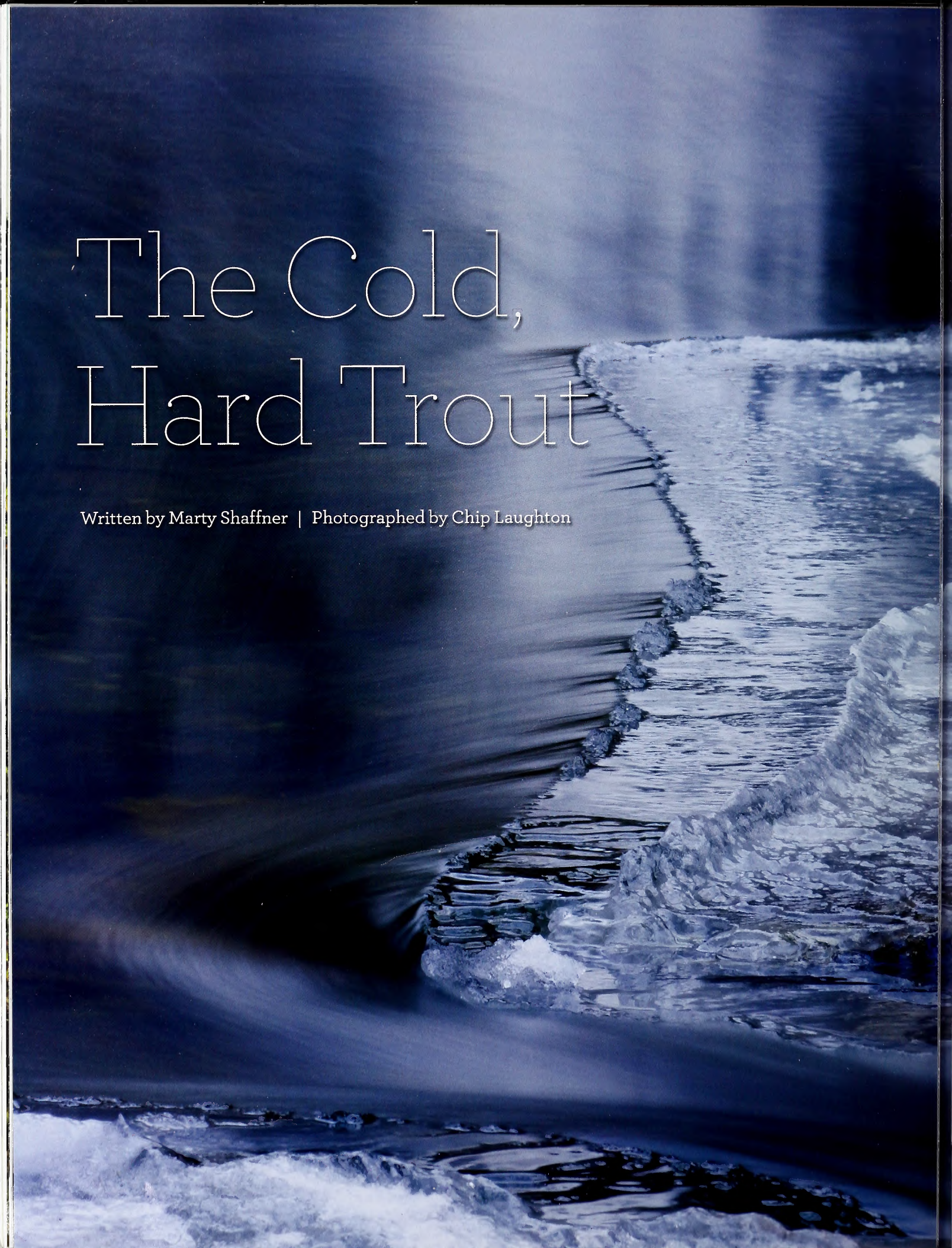
Abundant in our Coastal Plain, this personable, terrestrial toad may be identified by its prominent cranial knobs. Toads are tremendous insect control agents.

MARBLED SALAMANDER (*Ambystoma opacum*)

This secretive, boldly patterned salamander breeds in fall, nesting under sheltering objects along woodland pools. Females guard their eggs until winter rains fill the pools and the eggs hatch into aquatic larvae.

NEUSE RIVER WATERDOG (*Necturus lewisi*)

State-listed as a species of special concern, this large, fully aquatic salamander is a North Carolina endemic, found only in the Neuse and Tar river systems.



The Cold, Hard Trout

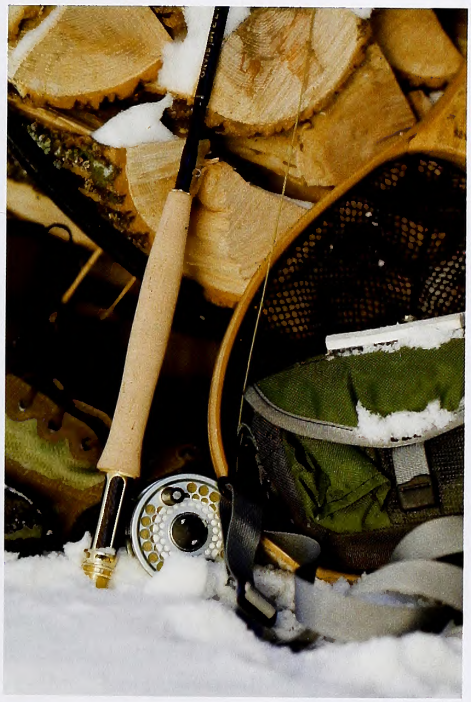
Written by Marty Shaffner | Photographed by Chip Laughton

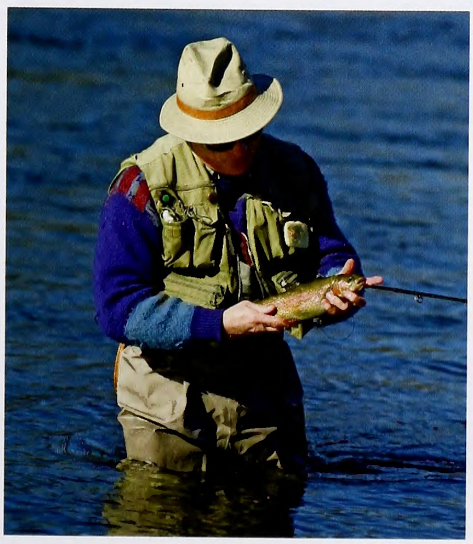
With the proper clothing, a change of tactics and a little determination, both fly-fishermen and spin anglers can have great trout fishing in the winter.

When I was in my early 20s, as soon as deer season was over, I began to long for the arrival of spring. Of course, winter hadn't even really begun when deer season ended, so I would clean up and rearrange tackle boxes, re-line reels, tie flies and sit around pouting. Except for the occasional small-game or bird hunt, I spent my time longing to wet a line.

Then I discovered winter trout fishing and wondered what I'd been moping about all those years. After I became a guide, most of my personal trout fishing took place during the winter months, when bookings were slow to nonexistent. Some of the best trout fishing of the year, especially for large trout, can be during the late fall and winter months.

Outfitted with proper clothing and gear and armed with slightly different tactics, fly and spin fishermen both can enjoy great angling and have a shot at their biggest trout ever. The majority of my large trout have come in the cold, including a huge hook-jawed brown trout I landed on a blood-chilling morning when the temperatures hovered in the upper teens. Preparation and having the right mind-set are half the battle in cold-weather fishing.





Dress for Success

Fishing in the cold without the proper clothing is miserable, if not impossible. To stay warm while fishing in the winter months, you must start with your hands and feet. Good wool socks are mandatory, and pairing them with thin, synthetic liner socks helps wick moisture away from your skin. Nothing keeps your feet warmer than wool. Go ahead and drop a little more money on a couple of pairs of quality wool socks and some thin synthetic liners. An additional tip is to wear only your liner socks while traveling to the stream so your feet don't sweat too much in your warm vehicle. The same applies to your other layers. Wear no more than you have to during your commute.

You'll find it is harder to keep your hands warm while fishing than when you're deer hunting. The humidity in the air around streams will seep through your gloves and clothing and chill you to the bone. I've tried everything from neoprene gloves to ski gloves and have settled on either wool or polar fleece (with a wind-blocker lining) mittens in which the finger and thumb sections fold back to convert to fingerless gloves. When folded back and converted to fingerless gloves, these mittens allow you to cast, tie knots and retrieve line easily because of the exposed fingers but still provide warmth to your hands.

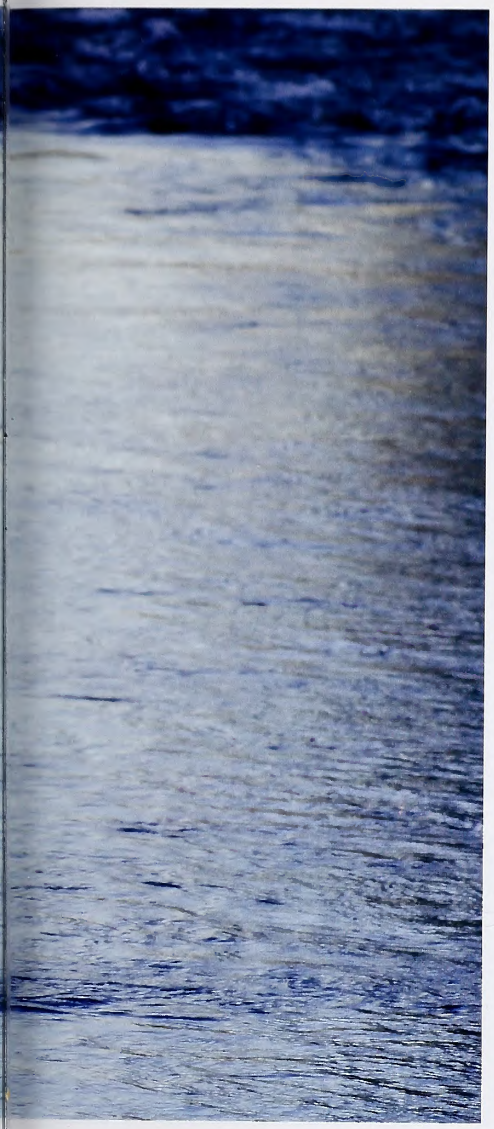
When your fingers become cold—and they will if you fish long enough—just fold the mitten part over your fingers and warm them up. When it is really cold, or if you have chronically cold hands like me, the disposable handwarmers available at most outdoor stores are an essential item. These handwarmers, when exposed to air and shaken, will stay warm for up to six hours. I use four of them, one stuck in the mitten part of each glove and one positioned on each wrist and held in place by the bottom part of the glove. The ones on your wrists are the most important ones because they warm the blood going into your hands and fingers. I can't lay claim to this little tip—a doctor friend of mine enlightened me about this trick—but I can tell you it works.

Although winter trout fishing takes a bit more thought as to proper clothing, some very nice fish are available in the cold.

Next is your body, and the key is layers. I would rather have one too many layers and have to take one off than wish I had another layer on. I have worked outside, hunted and fished for the last 26 years, and this has served me well.

If it is brutally cold, I wear four layers: a thin base layer, a thicker underlayer, an outer layer and then a windbreak layer to seal body heat in. My base layer is a pair of thin long underwear made of polyester or polypropylene that fits tight to the body. This is a wicking layer that wicks sweat away from the skin and dries quickly. Next comes a set of thick polyester fleece long underwear, which is sometimes called expedition weight; this is the insulating layer. Next I wear a pair of heavy fleece wading pants on the bottom and a heavy fleece jacket on top. I top all this off with a wind barrier and heat-retention layer. That's a fancy way of saying wear your raincoat even if it's not raining, and wear chest waders even if you're wading only knee deep. This seals wind out and body heat in.

Last but definitely not least is your head. You can lose a huge percentage of your body heat from an uncovered head. A baseball cap won't cut it in the cold. My favorite cap is a polar fleece stocking cap with a windblocker membrane, and I don't leave home in the winter without it. Dressed in this manner, I have fished with temperatures in the teens, and I can't say my hands were toasty, but my core body was warm, and I fished effectively. A last note: If your hands become too cold, remove your gloves or mittens, place your hands and mittens inside your coat under your armpits and you have an instant 98.6-degree handwarmer.



Flies, Rigging and Tactics

Well, you're all bundled up like the Michelin Man, and you're on the stream. Now what? A warning to all of you dry fly purists: You should have stayed home. Unless you are fortunate enough to catch a *Baetis* mayfly hatch, nymphs fished slowly on the bottom with lots of weight are the weapons of choice. Hatches are pretty slim during the winter, and fish are sluggish.

Any hatches that do occur will be small and usually consist of little black stone flies, various midges or members of the *Baetis* genus of mayflies. Most anglers lump all members of the *Baetis* flies together as blue-winged olives or simply bluewings. My favorite nymph patterns for winter fishing are small pheasant tail nymphs, any little black stone fly nymph pattern and small midge pupae patterns.

Little black stone fly nymphs can vary from elaborate patterns with rubber legs or goose biots to something as simple as a black pheasant tail. My two favorite little black stone nymph patterns are the black pheasant tail and the black copper john nymph, both in sizes 18 and 20. As for midges, I carry several variations and colors of the zebra midge. Colors usually are black, brown, gray and cream, with beadheads of clear glass, brass or black nickel and ribbing of gold or copper wire. If I could have only one color, I would choose black with silver wire and a black bead or clear glass bead.

Baetis nymphs can be effectively imitated by pheasant tail nymphs in almost all situations. The pheasant tail is my favorite nymph, period, and I carry it in plain and beaded versions in sizes from 12 to 24, but sizes 20 to 24 are used most in the winter. I prefer unbeaded patterns for winter fishing for two reasons. I'll be using split shot for weight because a bead just doesn't have enough weight to get the fly into the strike zone, and an unweighted fly will move more freely during the drift.

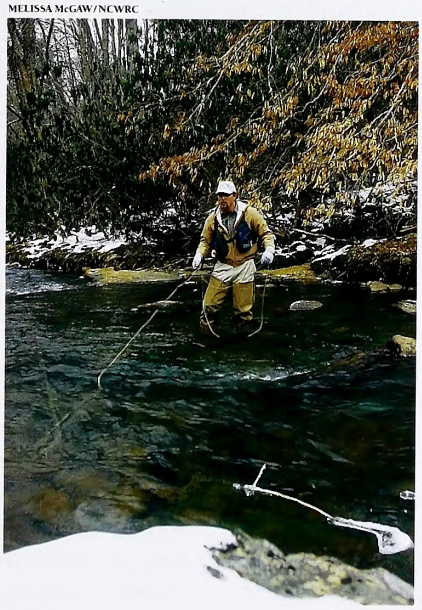
Speaking of split shot, in my opinion they are mandatory for winter fishing. Buy the removable type, because the number of split shot you'll use will vary according to water speed and depth. It takes a little while to get the hang of guessing how much weight is needed to get to the bottom. With some experience you can usually get pretty close on the first try, but you'll never get it right every time.

Two smaller split shot are better than a larger one of the same weight. Two smaller split shot will get hung on the stream bottom less often than one large one. I ask myself two questions every time I'm nymph fishing: *Have I bumped the bottom of the stream?* and *Have I caught or hooked a fish?* If the answer to both is no, then I need to add more weight, because my flies are not getting on the bottom, and the bottom is the strike zone in cold-water situations.

I fish with a strike indicator, and in winter I use poly yarn indicators exclusively. Not the premade ones with the rubber O-rings, but a piece of poly yarn half-hitched directly to the line. Yarn is so much more sensitive to subtle strikes than any other type of indicator, especially in slow water, and when rigged in this manner, it is the only way to go.

When fishing a rig with two or more split shot and a yarn strike indicator, leave the 3-weight rod at home, and forget about those graceful, long casts. Roll casts are almost all I do when fishing these rigs. Roll casting keeps tangles to a minimum and is much less tiring. Roll cast upstream and drift down all the way past yourself. At the end of the drift, lift the rod upward to get the weight off the bottom, and roll cast back into the run. I fish a 5-weight in the longest length possible, usually 8½ or 9 feet. The long rod helps with roll casting, mending your line and keeping as much of your line off the water as possible, which in turn enables you to get a better drift.

MELISSA McGAW/NCWRC



JIM DEAN

As important as how you fish are where and when you fish. Concentrate your efforts on the deeper, slower runs and pools in the stream, slowly probing the bottom. As water temperature gets lower, especially below 40 degrees, trout will seek out the slower, deeper areas of a stream, which are less affected by air temperature. Trout use less energy to hold in the stream against these currents, though the current brings food to them.

The days you fish are also important. I believe in the adage that the best time to fish is whenever you

can, but in winter not all days are created equal. Unlike at most times of the year, midday in sunny weather seems to be best, as the sun warms the water and increases trout activity. A warm period of several days can bring exceptional fishing. Approaching snow fronts and snowfall also produce great fishing. Trout feed heavily then, especially when it is actually snowing. Snowy days are magical times to be on the stream, but make sure you leave while it is safe to drive home. No trout is worth losing your life or wrecking your vehicle over.

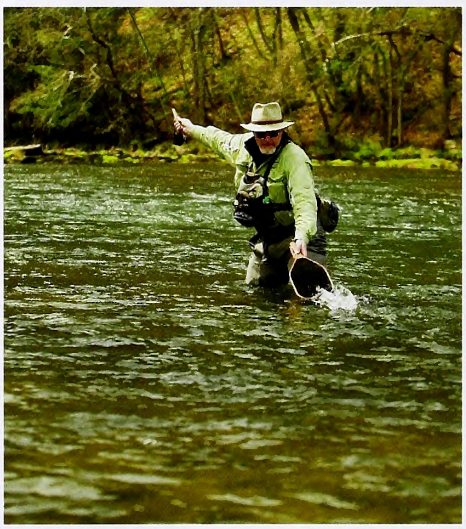
What If You Don't Fly-Fish?

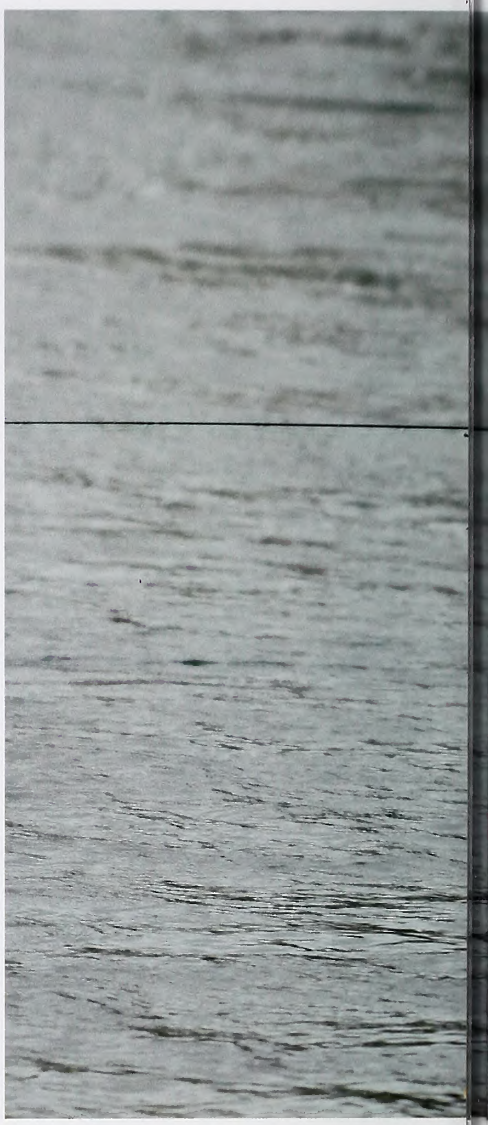
Anglers who use spinning gear can also get in on the cold-weather action. These same tactics work for spinning gear. Longer spinning rods are better at achieving good drifts than the shorter ultralight rods usually used by most trout fishermen.

One of the best trout fishermen I've ever fished with was my eighth-grade science teacher, Charles Golding. He was a master at high-stick fishing, a technique usually associated with fly-fishing with nymphs, but he fished with live bait, usually worms. His rod and reel of choice were an old 8- or 9-foot fiberglass fly rod and an automatic fly reel filled with monofilament line. His tactics and gear, although unconventional, were deadly. He could make even experienced anglers look like novice fishermen when he fished alongside them. His secrets were using enough weight to stay on the bottom and maintaining a good drift, both of which are key when fishing live bait or nymphs.

Another gentleman I knew specialized in catching big brown trout in the winter on bait. His bait of choice was minnows, and he would occasionally use night crawlers, if rain had made the water a little murky. His technique was on the other end of the spectrum. The minnow was hooked behind the dorsal fin lightly with a No. 6 or 8 hook, with a split shot big enough to hold the bait on the bottom. The minnow would frantically try to swim away from the weight, sending out predator-attracting vibrations and flash. This fellow targeted the large, deep, slow-moving pools where big browns live. Some days he might not catch anything, but some days he would catch what would be the fish of a lifetime for most anglers.

Both of these men were very specialized in their very different tactics, but they had





one thing in common: They both fished slowly and kept their bait on the bottom, where winter trout congregate. No matter what technique you use for winter trout fishing, keep your offering on the bottom.

Occasionally, during periods of warmer winter weather, lures can be effective. Minnow-type lures such as smaller Rapalas, Yo-Zuris or Daiwa minnows can produce large trout when the water has warmed and fish are more active. In deep pools, a CountDown Rapala (the sinking version of the Rapala minnow) or a floating minnow lure with split shot added enables the lure to be fished deeper, and that will catch more fish. Another effective but often overlooked lure for big trout is the Rebel Crawdad crankbait. Usually thought of as a smallmouth bass lure, it has caught it's share of big brown trout. Fish it in the same deep pools and runs as other lures.

Effective spinning outfits can be anything from short ultralight rigs to heavier medium-action rods. When fishing bait, I prefer a rod in the 6-to-6½-foot range with a light, forgiving tip but with plenty of backbone in a medium-light action. The soft tip helps prevent soft natural baits from being flung off when casting but still has the backbone to set the hook and help steer big trout from submerged wood and rocks. For casting lures, a shorter and lighter-action rod can be helpful, but I don't like a rod shorter than 5½ feet because winter fishing is usually done on larger waters.

A quality spinning reel matched in size to your rod is important because a smooth drag is invaluable when you hook up with a big hook-jawed brown trout. My line preferences are 4- to 8-pound quality mono line or 10-pound braid with a 6-pound

Aside from an occasional mayfly hatch, winter fly-fishermen should leave their dry flies at home and fish nymphs slowly on the bottom of the stream.

fluorocarbon leader. Fluorocarbon is more abrasion resistant, which means the knot connecting the leader to the braid will hold up better. There's less chance of breaking the knot, and also the line is not as visible to fish.

Winter Destinations

North Carolina has no shortage of places to fish for trout in winter. Any of the larger Delayed Harvest streams are good places to start, especially for a fly angler. If you are a spin fisherman, just remember that all lures should be unscented with single hooks on these waters. Good options for spin fishermen wanting to fish live bait are Hatchery Supported streams and, as long as you obtain permission from the landowners, the sections of water upstream and downstream of Delayed Harvest areas.

Most of the streams have holdover fish that travel both upstream and down and winter in these areas. The Cherokee reservation, with its larger streams, also is a great destination. The streams have sections that are designated for fly-fishing only, but there is a lot of water open to live bait and treble hooks. Almost any of the larger streams in North Carolina's Mountains can yield good winter trout fishing as long as you remember the tips discussed above and dress appropriately. So this winter get a jump on the season. You just might hook up with the trout of a lifetime. ⬘

Marty Shaffner is a writer and fishing guide living in Elkin. He is a frequent contributor to WINC. For the locations of Delayed Harvest, Hatchery Supported or other trout streams, visit www.ncwildlife.org.

Feral is the name given to domesticated animals that

Go Wild!

text and illustrations by Helen Correll / nature activity by Anne M. Runyon

A tiny kitten creeps toward a house, when the family dog wakes and spots him. *Woof! Woofwoof WOOF!* The kitten skitters up a dogwood tree and clings to a limb until the father, hearing the ruckus, comes out to see what is going on. The kitten hisses, and swipes at the man with his paw. "You're a wild little thing," he says. Wearing gloves for protection, the man lifts the feral kitten off the branch and puts him in a cage. He names him Tiger. The next day Tiger visits the vet, where he is neutered and gets a rabies shot. Within a few weeks, with patient care from the family, Tiger is tamed.

FERAL VS. DOMESTICATED

Domesticated animals have been bred to select genes for special characteristics such as tasty meat, willingness to work for people or a friendly disposition. Feral animals, like Tiger, are members of domestic species that are born in the wild and live as wild animals. Feral animals look like the domestic ancestor, but will act differently, and may never have contact with humans. They often join other feral animals to become part of a family group. North Carolina is home to feral horses, feral pigs, feral dogs and feral cats.

Because of their hard life, feral cats have a life span of only 3–5 years. House cats can live for up to 20 years.

A female pig can begin to have babies before six months of age and will continue to have large litters at short intervals.

WHO'S WHO

Feral horses in North Carolina are sturdy, pony-sized horses that live on Shackleford Banks, Corolla and Ocracoke Island, and feed on the coarse beach grasses and the few trees found there. They are thought to be descendants of horses brought by early Spanish and English explorers.

North Carolina's feral pigs are descendants of domesticated pigs that escaped from early settlers' farms. In 1900 and 1912, Russian wild boars were released on a hunting preserve in the mountains of western North Carolina and eastern Tennessee. Some of these boars escaped and bred with the feral pigs.

Feral dogs usually live in forested areas, but close enough to humans to take advantage of their trash and dump sites. They also eat road-killed animals, wild fruits and berries, and weak ducks and other birds.

Feral cats can be found living closer to humans than you would expect. They are in cities as well as the country, and use abandoned buildings, junk cars, brush piles, culverts and even the back corner of a garage for cover and protection. Like house cats allowed outside, they hunt and scavenge at night, preying on rodents, birds and reptiles, and eating garbage and pet food left outside. Like feral dogs, feral cats have ancestors who were once family pets.

PROBLEMS ABOUND

The problems caused by feral animals are many. Feral pigs can damage land by rooting or grubbing in fields, damaging fences and destroying crops or pastures. Their wallows can affect ponds and wetlands by killing native plants and muddying the water. Feral pigs have destroyed fragile ecosystems in the Great Smoky Mountains National Park and killed the young of ground nesting birds.

Feral dogs can, but don't always, travel in packs and have been known to kill more livestock and poultry than coyotes do. They also eat and damage fruit crops and kill family pets.

Feral dogs and cats eat the same food as native predators, seriously reducing the food available for natives such as raccoons, bobcats and foxes.

Feral cats are known to kill songbirds in huge numbers and also carry a multitude of diseases such as distemper, rabies, ringworm and salmonellosis.

The feral horses of the Outer Banks can be a threat to ground-nesting native animals such as sea turtles and shorebirds by interrupting nesting activities and stepping on the young. The beaches where they live are also home to the seabeach amaranth, an endangered plant that could be damaged if grazed or crushed by hooves.

WHAT'S TO BE DONE?

Feral animals in North Carolina remember no other way of life. Most people agree that something must be done about feral animals, but they disagree on what. Feral dogs and pigs are often shot if they are damaging land or attacking domesticated animals. Many feral cats are trapped and euthanized. Some people who love cats become caretakers of a colony of feral cats. They encourage the TNR (trap-neuter-return) method of population control, but studies have shown that TNR is basically ineffective at dealing with the problems feral cats cause. The wild horses that live on the Outer Banks have it good compared to the other feral animals. They live in land set aside for them on Shackleford Banks, Corolla and Ocracoke Island, and are considered a cultural treasure of the state. They are protected by special nonprofit organizations.

Because feral dogs are descendants of lost or abandoned family pets, it is often hard, from a distance, to distinguish one from the other. Up close it is obvious. Feral dogs are wary of people and do not wag their tails and act happy when approached, as do family pets. Instead most will become aggressive and growl, or bark, and usually run.

Get Outside

Spread the word! Now that you know about feral animals, one way you can help is to tell others how important it is to take special care of their pets. Dogs should be spayed or neutered and kept in a protected area. Cats should spend most of their time indoors. Many North Carolina cities and towns have nonprofit groups that help manage feral animals. There are several organizations at the coast to help the horses. If your family is interested in joining one, you can find one in your area online.

Read and Find Out

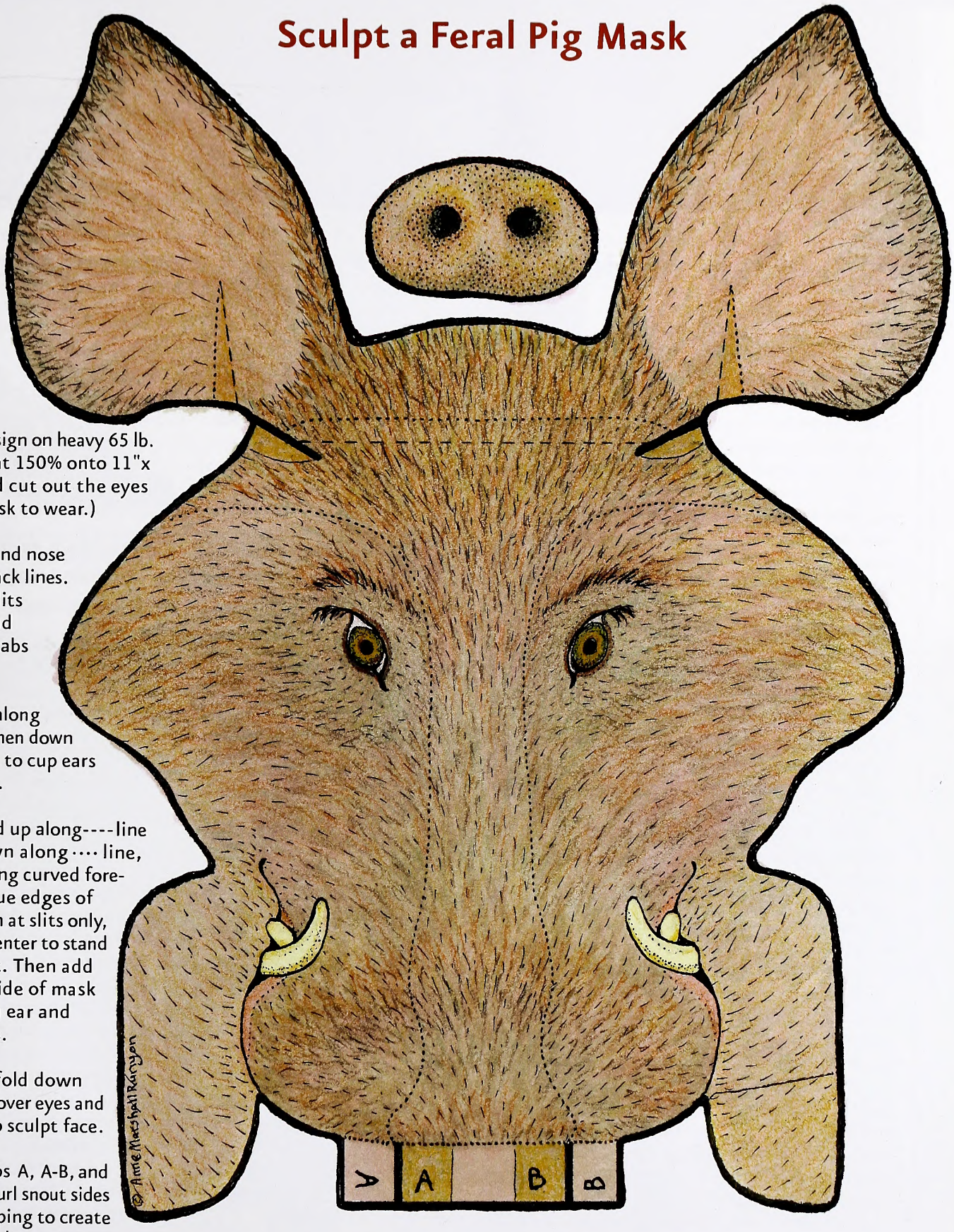
- "The Wild Horses of Shackleford Banks" by Carmine Prioli, John F. Blair, Publisher, 2007.
- "Cat, Cat, Feral Cat" by Clarissa Wolf, Avid Readers Publishing Group, 2009.
- "Wild Pigs in the United States: Their History, Comparative Morphology, and Current Status" by John J. Mayer and I. Lehr Brisbin, Jr., University of Georgia Press, 2008.

In *Wildlife in North Carolina:*

- "Hog Wild" by Mark Jones, February 2006.
- "Unbridled Alliance" by Greg Jenkins, February 2005.

Find out more about Project WILD Workshops and literature on the Wildlife Commission's website at www.newildlife.org.

Sculpt a Feral Pig Mask



1) Copy mask design on heavy 65 lb. paper. (Copy at 150% onto 11"x 17" paper and cut out the eyes for a large mask to wear.)

2) Cut out face and nose along thick black lines. Also cut the slits under ears and between the tabs A and B.

3) Ears: Fold up along ----lines and then down along ···· lines to cup ears forward. Glue.

4) Forehead: Fold up along----line and then down along ···· line, gently sculpting curved forehead. Now glue edges of forehead down at slits only, allowing the center to stand up like a crest. Then add tape to backside of mask to strengthen ear and forehead folds.

5) Face: Gently fold down along ···· lines over eyes and down snout to sculpt face.

6) Snout: fold tabs A, A-B, and B down. Now curl snout sides down, overlapping to create chin and glue shut.

7) Nose: Glue tab A to A, tab B to B and then glue nose in place on them.

Mountain Heritage Trout Program Adds Locations

Old Fort and Burnsville have recently joined the N.C. Wildlife Resources Commission's Mountain Heritage Trout Waters Program.

In Old Fort, located in McDowell County, a .7-mile section of Mill Creek that runs through the downtown area, now is classified as a Mountain Heritage Trout Water. Because it is Delayed Harvest trout water, anglers must use single-hook artificial lures and cannot harvest or possess any trout from Oct. 1 until one half-hour after sunset on June 3, 2011. The section will then remain closed to fishing until 6 a.m. on June 4, when it reopens to anglers 15 years and younger under Hatchery Supported regulations, with no bait restriction, no minimum length limit and a 7-trout-per-day creel limit. The section will open to anglers of all ages at noon on June 4. Hatchery Supported regulations remain in effect until Oct. 1 each year.

In Burnsville, the .75-mile section of the South Toe River located in the Yancey County Toe River Campground is classified as a Mountain Heritage Trout Water. It is Hatchery Supported water where anglers have no bait/lure restrictions, no size limit restrictions and a 7-trout-per-day creel limit from 7 a.m. on the first Saturday in April until the last day of February. Hatchery Supported waters are closed to fishing from March 1 until the first Saturday in April.

The Mountain Heritage Trout Waters program, established in July 2008, promotes trout fishing as a North Carolina Heritage Tourism activity. The Mountain Heritage Trout Waters license is available only from the Wildlife Commission by calling 1-888-248-6834 or ordering online. This $5 license is available for anglers 16 years and older and is only valid for three consecutive days in Mountain Heritage Trout Waters.

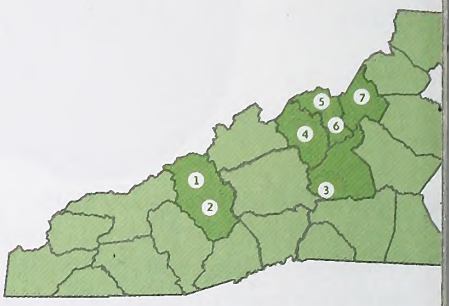
Anglers who currently hold a valid resident or non-resident North Carolina trout fishing license can fish Mountain Heritage Trout Waters at no additional cost.

BROWN TROUT

RAINBOW TROUT

BROOK TROUT

ILLUSTRATIONS BY DUANE RAVER



Mountain Heritage Trout Program Locations

1 Maggie Valley
2 Waynesville
3 Old Fort
4 Burnsville
5 Bakersville
6 Spruce Pine
7 Newland

For visitors who do not have fishing equipment, loaner rods and reels are available free of charge on a first-come, first-serve basis through the commission's Tackle Loaner Program, which offers rods and reels, including spincast, ultralight and fly rods, for the day.

In Burnsville, anglers register at the Toe River Campground office, located on Patience Park Road, to receive a tackle-loaner identification card and check out a rod and reel for the day. In Old Fort, visitors can borrow a rod and reel at Mountain Gateway Museum, located at 102 Water Street in Old Fort.

After returning the loaner rod and reel, first-time participants under 16 receive a free mini-tackle box containing tackle, such as lures, flies, spinners. Tackle loaner program registrants can use their identification cards at any participating tackle loaner site across the state, including the six tackle loaner sites associated with the Mountain Heritage Trout Waters program: Spruce Pine, Maggie Valley, Waynesville, Bakersville, Burnsville and Old Fort. Rods and reels must be returned to the original loaner site.

Download Mountain Heritage Trout Water maps or find out more information about the program at www.ncwildlife.org.

e NEWSLETTER
Get N.C. Wildlife Update—news including season dates, bag limits, legislative updates and more—delivered to your Inbox from the N.C. Wildlife Resources Commission. Sign up at www.ncwildlife.org/enews.

Green Growth Certification Available

The N.C. Wildlife Resources Commission, along with the N.C. Wildlife Federation and the North Carolina chapter of the American Society of Landscape Architects, has unveiled a green-growth initiative that encourages wildlife-friendly practices for new and existing residential developments.

KEN TAYLOR / NCWRC

The Wildlife Friendly Development Certification program recognizes residential land developers who promote the conservation of wildlife habitat and use environmentally sound construction practices in their developments.

Developments that are certified as wildlife friendly incorporate features that protect existing habitats by providing food, water, cover and places to raise young, the four components of suitable wildlife habitat. Once certified, these developments can be marketed to homeowners who value the protection of natural resources.

To acquire certification, developers work closely with the staffs from the Wildlife Commission and Wildlife Federation to determine what wildlife friendly features will be incorporated into the development to earn certification. Developers must include a certain number of wildlife friendly features throughout all phases of the development's planning and construction, and must maintain these features once the development is completed.

"North Carolina is experiencing unprecedented growth. Through sustainable development practices outlined in this program, we can contribute to the conservation of wildlife habitats alongside new developments," said David Cox, the commission's technical guidance supervisor. "This voluntary program allows for growth but, at the same time, conserves wildlife resources and improves the quality of life for homeowners."

While the program is intended for developers to participate from the initial stages of residential planning, some existing developments may qualify for certification depending on the number of wildlife friendly features already incorporated.

Visit www.ncwildcertify.org to find out more about this voluntary program and to download the Wildlife Friendly Development handbook, which describes the certification process in detail and provides a step-by-step guide for developers to create a Certified Wildlife Friendly Development.

Commission Staff Members Earn Governor's Awards

Two staff members and a volunteer with the N.C. Wildlife Resources Commission are among the recipients of the Governor's Conservation Achievement Awards, presented at the 47th annual banquet by the N.C. Wildlife Federation.

The Wildlife Federation named Master Officer Chad Starbuck as Wildlife Enforcement Officer of the Year; Inland Fisheries' Special Projects Coordinator Chris Goudreau as Water Conservationist of the Year; and Lanny Cowan as Hunter Safety Educator of the Year.

The announcement and presentations came at the awards banquet on Sept. 18, an occasion for recognizing those who exhibit an unwavering commitment to conservation and an uncommon determination to safeguard the state's natural resources.

"Each year our awards committee puts out an all-points-bulletin for conservation heroes," said Tim Gestwicki, executive director of the N.C. Wildlife Federation. "We seek to learn about those people, agencies, and businesses that go an extra 10 miles in the cause of conserving North Carolina's natural treasures. And each year we are amazed at the commitment and creativity of North Carolina citizens in protecting wildlife and wild places. Our primary focus is to applaud and honor these people who work so hard for wildlife and the air, water, land that they and all of us depend upon."

Those recognized for their stewardship and conservation from the N.C. Wildlife Resources Commission:

- Goudreau was a critical player in the five-year effort to renegotiate the hydropower licensing agreements along the Catawba River. His leadership in stakeholder collaboration resulted in major improvements to wildlife habitat in the region.
- For 16 years, Cowan has volunteered as an instructor through the Hunter Education Program, teaching vital and potentially lifesaving lessons. He has taught hunting education courses in Hertford County since 1999, and at Ridgecroft School for six years.
- Patrolling Alexander County, Starbuck enforces fishing, game and boating regulations in his law enforcement duties while also working to educate the public, especially youth, about the need for wildlife conservation.

NCWRC

NCWRC

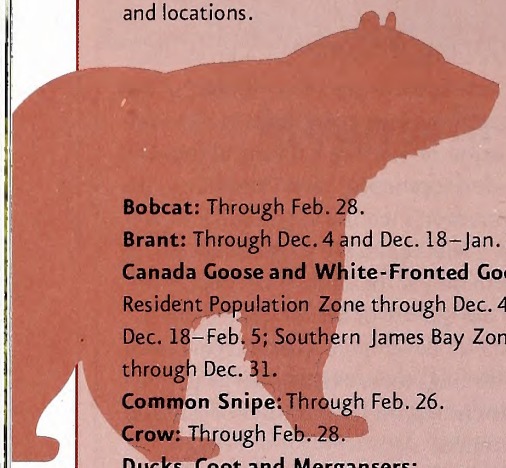
From left, Master Officer Chad Starbuck, fisheries biologist Chris Goudreau and hunter safety educator Lanny Cowan were honored.

The N.C. Wildlife Federation is the state affiliate of the National Wildlife Federation. The nonprofit creates consensus by engaging government, industry and the public in efforts to protect wildlife resources. For more information, go to www.ncwf.org or call (919) 833-1923.

IN SEASON

This month, these seasons are open in North Carolina:

Black Bear: See *Regulations Digest* for seasons and locations.



Bobcat: Through Feb. 28.
Brant: Through Dec. 4 and Dec. 18–Jan. 29.
Canada Goose and White-Fronted Goose: Resident Population Zone through Dec. 4 and Dec. 18–Feb. 5; Southern James Bay Zone through Dec. 31.
Common Snipe: Through Feb. 26.
Crow: Through Feb. 28.
Ducks, Coot and Mergansers: Through Dec. 4 and Dec. 18–Jan. 29.
Fox: See *Regulations Digest* for seasons and locations.
Light Geese (Snow, Blue and Ross'): Through March 9.
Mourning Doves and White-Winged Doves: Dec. 18–Jan. 14.
Pheasant: Through Feb. 1.
Quail: Through Feb. 28.
Rabbit: Through Feb. 28.
Raccoon and Opossum: Through Feb. 28.
Ruffed Grouse: Through Feb. 28.
Sea Ducks: Through Jan. 31.
Squirrel: Gray and red through Feb. 28; fox through Dec. 31 in selected counties.
Tundra Swan: Through Jan. 31 (by permit only).
White-tailed Deer:
Eastern: Gun season through Jan. 1.
Central: Gun season through Jan. 1.
Northwestern: Gun season through Jan. 1.
Western: Gun season through Dec. 11.
Wild Boar: Through Feb. 28 only in Cherokee, Clay, Graham, Jackson, Macon and Swain counties. In the other 94 counties of the state, feral hogs are not considered to be wild boars, and the commission does not regulate them.
Woodcock: Dec. 31–Jan. 29.

There is no closed season or bag limit for groundhog, coyote, striped skunk, nutria and armadillo. There is an open season for taking beaver with firearms or bow and arrow during any other open season for the taking of wild animals.

Check the *2010–2011 North Carolina Inland Fishing, Hunting and Trapping Regulations Digest* for bag limits and applicable maps or visit www.ncwildlife.org.

Researchers Find Clue to Colony Collapse Disorder

WILL COOK

The sudden death of bee colonies since late 2006 across North America has stumped scientists, but a team of researchers may have found a clue to the cause of the mysterious Colony Collapse Disorder (CCD). (See "Plight of the Honeybee, Flight of the Bumblebee," Sept. 2008.)

Shan Bilimoria, a professor and molecular virologist at Texas Tech University, said the bees may be taking a one-two punch from an insect virus and a fungus, which may be causing bees to die off by the billions.

Bilimoria is part of a team of researchers searching for the cause of the collapse. Led by research professor Jerry Bromenshenk from the University of Montana in Missoula, the group also includes virologists and chemists from the U.S. Army Edgewood Chemical Biological Center and the Instituto de Ecologica AC in Mexico. Their study was published in the journal *PLoS ONE*.

"At this stage, the study is showing an association of death rates of the bees with the virus and fungus present," Bilimoria said. "Our contribution to this study confirms association. But even that doesn't prove cause and effect. Not just yet."

The mysterious colony deaths have caused major concern with scientists since much of agriculture depends on bees to pollinate crops. To discover what might be attacking bee colonies, the team ground up dead bees that had succumbed to colony collapse disorder. Using analytical equipment, researchers discovered through spectroscopic analysis evidence of a moth virus called insect iridescent virus (IIV) 6 and a fungal parasite called Nosema.

The insect virus is closely related to another virus that wiped out bee populations 20 years ago in India, he said. Also, unlike previous research that found the deaths may be caused by a virus with RNA, the IIV 6 contains DNA. "Our DNA discovery puts this field in a whole new direction," he said.

Bilimoria said Texas Tech supplied the virus material for the experiments and were tested on bees with the fungus. Though an association between exposure and death was found, scientists don't yet know if the two pathogens cause CCD or whether CCD colonies are more likely to succumb to the two pathogens. "To prove cause and effect, we will have to isolate the virus and fungus from a bee colony, and then reinfect with the same virus and fungus," Bilimoria said.

In the next part of the research project, Bilimoria will work to isolate the virus from infected bees. "Once we isolate and identify the virus, we will have a way of monitoring it," he said. "It is easier to fight the problem if we know what the culprit is."

CALENDAR OF EVENTS

Saturday–Sunday, December 4–5

Check out the 23rd Annual Core Sound Decoy Festival at Harkers Island Elementary School. Activities include carving competition, children's decoy painting, retriever demonstration, decoy auction, head carving contest and the world loon calling competition. Over 90 exhibitors will be displaying and selling decoys and waterfowl artifacts. Waterfowl Weekend at the Core Sound Waterfowl Museum runs concurrently with the Decoy Festival. Visit www.decoyguild.com and www.coresound.com.

Tuesday, December 14

Take a winter waterfowl tour by boat of Currituck Sound at the Outer Banks Center for Wildlife Education in Corolla. Visit www.ncwildlife.org or call (252) 453-0221, ext. 3.

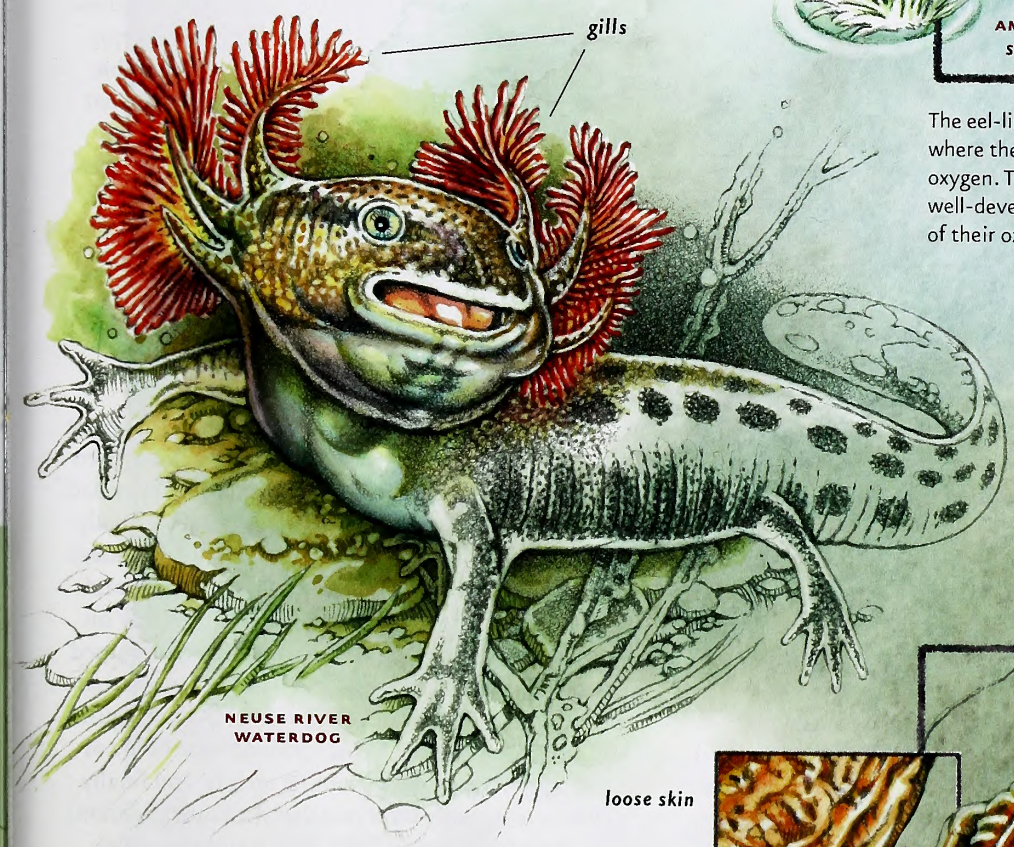
Readers should check with the contact listed before traveling to an event. Items for listing should be conservation-oriented and should be submitted at least four months in advance to jim.wilson@ncwildlife.org, or call (919) 707-0177.

How Do Aquatic Salamanders Respire?

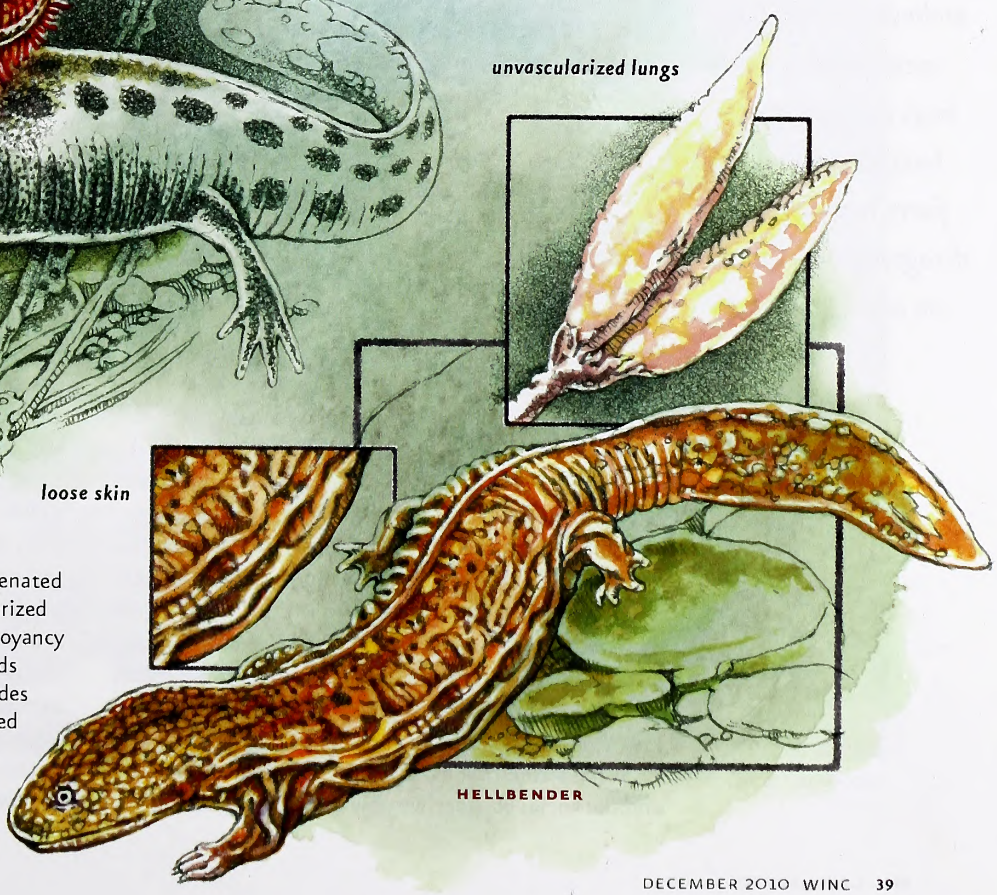
written by Clyde Sorenson
illustrated by Jim Brown

WHILE MANY SALAMANDERS ARE, indeed, functional "amphibians," living part of their life as larvae in water and part as adults on land, many are aquatic for their entire life. Water-dwelling salamanders acquire the oxygen they need, and get rid of the carbon dioxide they produce, several ways.

Many aquatic species retain the external gills common to most larval salamanders into adulthood. The gills are basically outgrowths of the circulatory system containing abundant blood vessels; oxygen moves in to the gills and CO_2 moves out. If the oxygen content of water decreases, the gills enlarge, increasing the surface area available for gas exchange.



The eel-like sirens and amphiumas frequent swampy areas where the water is often warm and very low in dissolved oxygen. These big salamanders rely on air gulped into their well-developed lungs from the water's surface for much of their oxygen.



The giant hellbender lives in large, cool, well-oxygenated mountain rivers. Its lungs are essentially unvascularized balloons, useless for gas exchange but valuable in buoyancy control. The hellbender harvests the oxygen it needs through its skin — the large, loose flaps along the sides of its body, together with its flattened body, flattened tail and webbed feet all serve to greatly increase the surface area available for gas exchange.

Who Shot Santa?

written by Jim Dean

ILLUSTRATION BY JACKIE PITTMAN

The scene is as clear as day in my mind, except it is certainly no later than 4:30 in the morning, with actual daybreak on this cold December morning still many hours away. My brothers Graham and John and I are actively gathered at the top of the stairs, bolting and straining like tethered hounds. Peering through the stair rails, we can see shadowy unfamiliar forms and promising glimmers of shiny things on the living room floor. "Hurry, hurry up," we clamor as Mom elbows her way past us and descends the stairs, leaving Dad standing behind with a whimsical grin.

It is all part of our Christmas morning tradition. Once the tree is lit—only the tree—we pause for the briefest moment as the shapes and sparkles are transformed below us, then we are swiftly among them, unerringly drawn to those presents Santa has left each of us. As the initial madness subsides, Mom disappears into the kitchen to make breakfast, which we devour in the midst of our sudden wealth. Only then are we allowed to open the wrapped presents under the tree, although "open" hardly befits the explosion of paper and ribbon that ensues. Finally, there is a moment of relative calm with the three of us awash to our chins in paper and treasure. Mom and Dad are sitting quietly, sipping their coffees, and exchanging bemused smiles. Outside, it is still pitch black.

"As you might expect, I have my doubts that endless summer days spent playing cowboys or staging epic battles around tin forts have had any disagreeable impacts on our adult lives."

Similar rituals are under way in houses all around us, or at least those where kids celebrate Christmas much the way we did in the late 1940s and '50s. We are, my brothers and me, blissfully unaware that there is any other way.

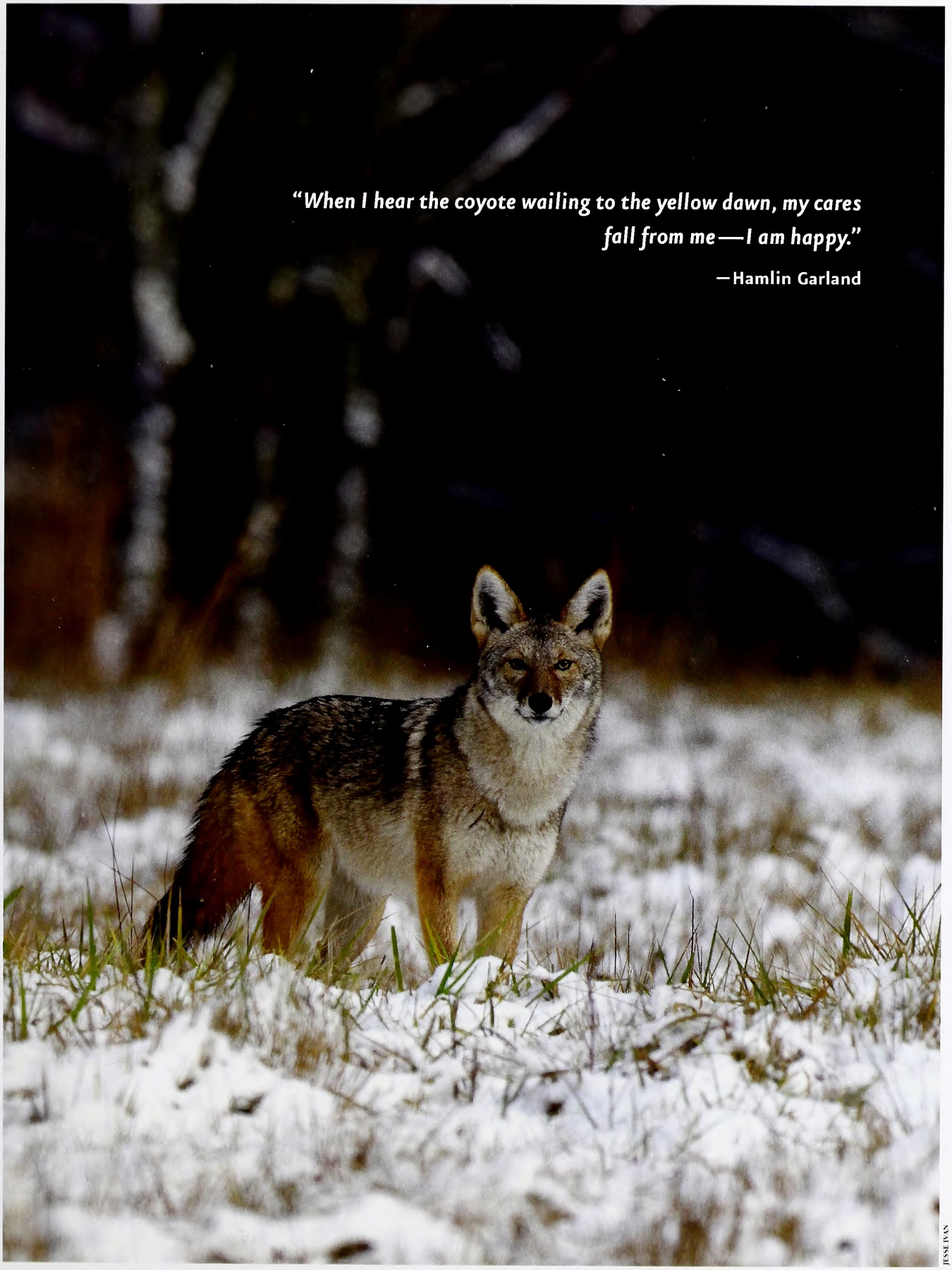
Such family traditions are still essential parts of Christmas for many of us, even though cherished participants may no longer be with us and our roles are evolving. Reflecting recently on my long memories of Christmas holidays, I am struck by significant, and not always subtle, changes. It is not merely that we are no longer children, or even still raising our own. Nor is it necessarily sad to be alone Christmas morning (no hounds are howling here at 4:30, thank goodness), and there is a fair chance that we can later join our scattered family at a civilized hour.

What strikes me as markedly different are the gifts, and the social baggage we now attach to some that were once so common. Bicycles and dolls still show up, but technology has bypassed Erector sets, Tinkertoys, Lincoln Logs and most board games. Cowboy outfits with twin holsters and cap pistols have virtually disappeared, along with tanks, military toys and tin Fort Apache sets with their miniature plastic cowboys and Indians. Most notably absent are real guns—that first air rifle, .22 or shotgun. The broad consensus nowadays is that these gifts celebrate violence, and send our impressionable children the wrong signal. That argument would make far more sense, however, if so many of the countless electronic games that have replaced them were not at least equally violent. Are we simply hypocrites, or is it possible that kids have never been all that easily corrupted?

As you might expect, I have my doubts that endless summer days spent playing cowboys or staging epic battles around tin forts have had any disagreeable impacts on our adult lives. Indeed, this may be what kids naturally do—have always done—and it may even serve some useful function as part of our hunter-gatherer DNA (the same combative youthful play is echoed throughout the animal kingdom). My own favorite childhood "army" consisted of a dozen threadbare teddy bears—their fur worn off during battle—that were well armed with toy guns and table-knife swords, and fiercely led by a cutthroat alter ego improbably named Cuddles.

Many would argue that real guns change this game significantly. But must they? A Santa gun back then was typically given to boys or girls only after they had demonstrated a level of budding maturity—usually at 12 or older—and the gift served as a rite of passage with some hefty strings attached. Parents and grandparents emphasized safety, and were invariably on hand to enforce it. A kid entrusted with a gun wanted above all to earn that trust, and was well aware that even the slightest infraction would cause both gun and trust to disappear. What followed were hours of instruction, happy days shooting targets, and finally a chance to actually hunt (another declining tradition) with the adults. Not only did such training greatly reduce the chance of accidents, it was far less likely to produce a citizen who had grown up to become a gun-wielding threat to society. Compare that to the haphazard way many kids and young adults are typically introduced to guns these days—and the sad results.

Ironically, when Santa was still hauling real guns in the sleigh for boys and girls with responsible parents, the world was likely a much safer place.

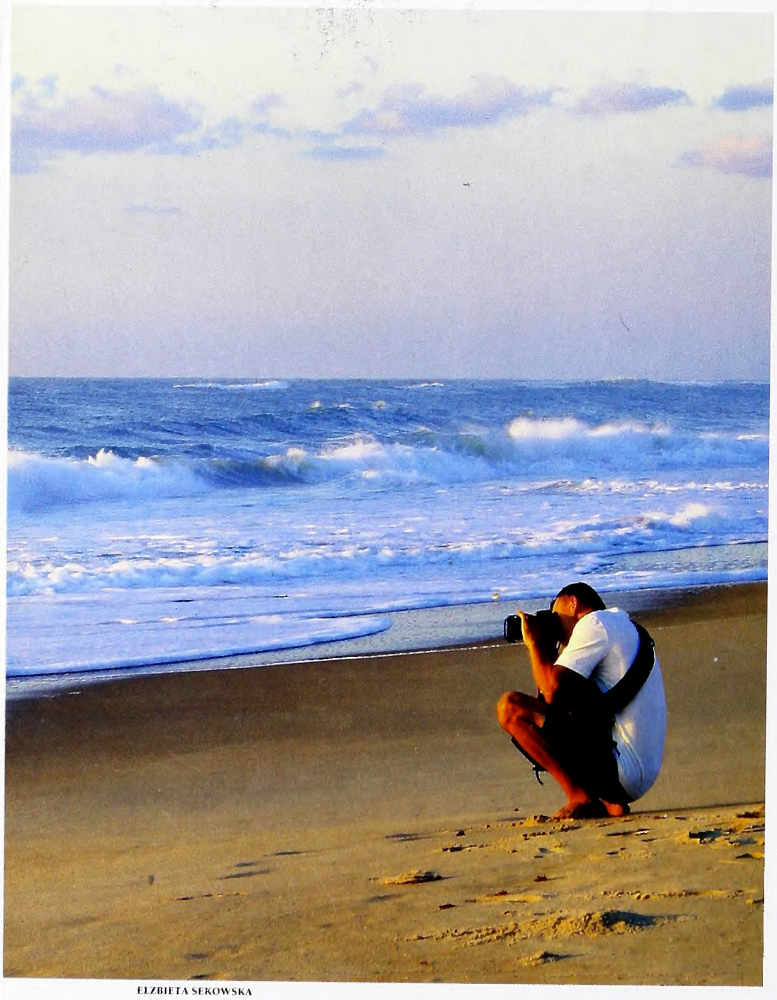


JESSE IVAN

OUTDOOR MOMENT

Coyote at Cataloochee

IN THE JANUARY ISSUE



ELZBIETA SEKOWSKA

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